WORK PLAN

FOR WATERSHED PROTECTION AND FLOOD PREVENTION

HIGINBOTHAM BROOK WATERSHED

MADISON COUNTY, NEW YORK

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
FOREST SERVICE

SOIL CONSERVATION SERVICE

ADDENDUM

HIGINBOTHAM BROOK WATERSHED WORK PLAN

Madison County, New York

INTRODUCTION

This addendum was developed in accordance with phase-in procedures agreed to between the Water Resources Council and the USDA, Soil Conservation Service for Level C plans for which field studies, analyses, and evaluations were completed as of October 25, 1973, and which have been formulated in accordance with Senate Document 97, as supplemented and amended, and which are to be transmitted to the OMB between December 31, 1973 and December 31, 1974.

DISCOUNT RATE COMPARISON

This plan was formulated before October 25, 1973 following the general guidance outlined in Senate Document 97. However, in evaluations, an interest rate of 6 7/8 percent, as outlined in the Principles and Standards, was used. Installation costs are based upon prices being experienced in 1974. Benefits and operation and maintenance costs are based upon adjusted normalized prices. Average annual costs are $17,600, average annual benefits are $21,670, and the benefit cost ratio is 1.2:1.0.

Using an interest rate of 5 7/8 percent, 1974 prices for installation costs and adjusted normalized prices for benefits and operation and maintenance costs, average annual costs are $15,100, average annual benefits are $21,670 and the B:C ratio would be 1.4:1.0.

THE ABBREVIATED ENVIRONMENTAL QUALITY PLAN

ENVIRONMENTAL CONCERNS

The major environmental concerns in this watershed are:

1. Natural beauty
2 Quality of water, land and air resources
3. Biological resources and ecological systems
4. Geological, archeological, and historical resources

Erosion, or the wearing away of land surface by running water, wind, ice, or other geological agents, is present throughout the watershed. Most of the high rates of erosion occur in the upland areas as a result of poor management, steep topography, cultural operations, and highly erosive soils. Erosion in the flat sections of the watershed is occurring, but at a very low rate.

About 80 acres of the watershed are not adequately protected by vegetation; consequently, erosion rates on these areas are in excess of maximum allowable rates defined by the Soil Conservation Service.

Sediment damage in the watershed is limited to accumulation of bedload materials in bridges and culverts and costs about $800 per year for cleanout. Sediment concentration is estimated to be approximately 120 milligrams per liter (mg/l), based on sediment yields of 350 tons per year at the mouth of the watershed. The size and texture of sediment reaching Oneida Creek is primarily fine grained silts and clays. Discoloration of the water in Oneida Creek, for a short distance downstream from the mouth of the brook, occurs during peak flows.

Agricultural wildlife habitat is being reduced as cropland and open land formerly cropped is gradually being converted to urban and forest land. Total agricultural wildlife habitat is about 571 acres presently and will be about 145 acres by the year 2000.

Periodic inundation of the 17-acres of open land wildlife habitat within the urban area results in sediment deposition on grasses and other forages, and drowned nestlings. Wildlife species are temporarily forced out of the area by floods

OBJECTIVES

The objectives of the sponsors are to preserve areas of natural beauty; maintain or enhance the quality of water, land, and air resources; improve and maintain biological resources and ecological systems; and to prevent destruction or loss of geological, archeological, and historical resources.

COORDINATION

The sponsors, interested local groups, state agencies, Environmental Protection Agency, and U. S. Fish and Wildlife Service have been involved in planning efforts regarding environmental aspects of the project.

FORMULATION

The land treatment phase of the plan applies to each acre in the watershed. Landowners and operators will be encouraged to manage their lands to maintain adequate cover and existing treatment measures. They will also be encouraged to install conservation measures to meet problems in the watershed. Individuals will install these measures dependent upon their individual interests, their means to do so, and applicable state and local laws.

Technical assistance will be provided to plan land use changes, install needed conservation measures, manage watershed resources, and maintain conservation measures. Assistance will be given to planning and zoning boards, community leaders, and land developers in the proper use, treatment,and development of resources in the expanding urban area. General technical assistance will also be provided for environmental education and stimulation of landowners to participate in good land management practices.

Through consensus of the conservation district, community leaders, landowners, and state and federal agencies, it was agreed that adequate land treatment should be applied to 50 acres of cropland, 36 acres of pastureland, 180 acres of forest land, 28 acres of other land, and 80 acres of urban and built-up land during the 3-year installation period. Table 1 indicates planned types and estimated amounts of land treatment measures to be applied.

Wildlife habitat management practices will be interspersed throughout the watershed. These practices will be for the primary use of wildlife and include planting grasses, legumes, and shrubs; constructing watering facilities; and releasing apple trees and other valuable food plants. Time required to install the land treatment measures would be three years.

The estimated cost for application of the land treatment phase would be about $18,050. Technical assistance costs for the land treatment phase would be about $24,900.

TABLE 1 - LAND TREATMENT INSTALLATION

Land Treatment Measures	Unit	Estimated Amounts
Cropland		
Conservation Cropping System	Acre	50
Contour Farming	Acre	50
Stripcropping	Acre	50
Crop Residue Management	Acre	25
Diversion	Feet	500
Pastureland		
Pasture and Hayland Management	Acre	36
Pasture and Hayland Planting	Acre	10
Critical Area Planting	Acre	1
Mulching	Acre	1
Forest Land		
Tree Planting	Acre	100
Forest Environmental Improvement	Acre	40
Woodland Grazing Control	Acre	40
Wildlife Upland Habitat Management	Acre	20
Urban and Other		
Urban Environmental Forestry	Acre	50
Critical Area Planting	Acre	15
Mulching	Acre	15
Diversion	Feet	500

IMPLEMENTATION

The proposed Environmental Quality Plan could be implemented through P. L. 566 administered by the Soil Conservation Service. Authorities provided through this act could be used to supplement authorities of the county, state, and federal agencies.

The land treatment phase could be implemented through the Madison County Soil and Water Conservation District. Technical assistance could be provided by local, state, and federal agencies through their going programs in accordance with their authorities and responsibilities. P. L. 566

funds might be used by the Soil Conservation Service and the Forest Service to provide accelerated technical assistance. The landowners and operators would finance the cost of installing measures on their land, utilizing their usual source of funds with cost sharing assistance available through going conservation programs.

EFFECTS AND IMPACTS

The combined effects of the abbreviated Environmental Quality Plan would be to preserve areas of natural beauty; improve the quality of water, land and air resources; maintain and improve biological resources and ecological systems; and avoid disturbance of archeological and paleontological materials as compared to conditions that might exist without a plan or with other plans.

The land treatment alternative would provide technical assistance to review and make needed revisions of conservation and woodland plans; to maintain existing cover which is adequate and to install essential land treatment measures; and to plan and apply land treatment measures applicable to land areas which require treatment.

The land treatment would be applied to all of the land in the watershed. Conservation measures would be applied on cropland, pastureland, forest land, urban land, and other land as described.

Land treatment would improve the hydrologic condition of the watershed and reduce runoff from the 100-year frequency storm event by about 3.6 percent. Woodland wildlife habitat would be increased by about 100 acres.

The installation of vegetative and structural types of land treatment measures would effectively reduce runoff, conserve soil moisture, and prevent excessive losses of topsoil. The amount of sediment leaving the watershed would be reduced by 70 tons annually. Land treatment measures would enable landowners to better implement sound land management plans and increase efficiencies of production, increase wildlife habitat, and improve water quality.

Investigations conducted by the Kirkland College's Archeological Department indicate that there are no historical or archeological materials or data in the watershed. The National Register of Historic Places lists no properties in the watershed such as historic districts, sites, buildings, structures, or objects which are significant in American history, architecture, archeology, and culture.

DISPLAY ACCOUNTS - SELECTED PLAN

A display of the beneficial and adverse effects are given in the following pages for:

National Economic Development
Environmental Quality
Regional Development
Social Well-being

HIGINBOTHAM BROOK WATERSHED

SELECTED PLAN

NATIONAL ECONOMIC DEVELOPMENT ACCOUNT

Components	Measures of Effects 1/	Components	Measures of Effects
Beneficial effects:		Adverse effects:	
A. The value to users of increased outputs of goods and services		A. The value of resources required for a plan	
1. Flood prevention	$19,970	1. Floodwater retarding structure	
2. Land treatment	$2,960	Project installation (structural measures)	$14,700
		Project administration	$2,000
		O&M	$900
		2. Land treatment	
		Project construction	$2,670
		O&M	$290
Total beneficial effects	$22,930	Total adverse effects	$20,560
		Net beneficial effects	$2,370

1/ Average annual values based on 100 years at 6 7/8 percent interest.

HIGINBOTHAM BROOK WATERSHED

SELECTED PLAN

ENVIRONMENTAL QUALITY

Components	Measures of Effects
Beneficial and adverse effects:	
A. Areas of natural beauty	1. 2.5 acres of forest and 0.5 acre of open land formerly cropped will be changed to 2 acres of water and 1 acre of dam and spillway
B. Quality considerations of land, water and air	1. Silt concentration will be reduced from 120 mg/1 to 39 mg/1
	2. Structure will result in an 80 percent reduction in damage
	3. Sediment yields to flood plain will be reduced by 77 percent
	4. Flood damages will be reduced from $25,100 to $4,850
C. Biological systems and ecological resources	1. 17 acres of wildlife habitat - periodic relief from flooding
D. Irreversible and Irretrievable	1. 11 acres of floodpool will revert to low intensity use because of periodic inundation

HIGINBOTHAM BROOK WATERSHED

SELECTED PLAN

REGIONAL DEVELOPMENT ACCOUNT

Components	Measures of Effects 1/ State of New York	Rest of Nation
Income:		
Beneficial effects:		
A. The value to users of increased output of goods and services		
1. Flood prevention	$19,970	
2. Land treatment	$2,960	
B. The value of output to users by region from external economies		
1. Indirect activities associated with increased agricultural production (processing and storage)	$1,700	-$1,700
Total beneficial effects	$24,630	-$1,700

Components	Measures of Effects State of New York	Rest of Nation
Income:		
Adverse effects:		
A. The value of resources contributed from within the region to achieve the outputs		
1. Floodwater retarding structure		
Project installation (structural measures)	$650	$14,050
Project administration	$300	$1,700
O&M	$900	
2. Land treatment		
Project construction	$2,670	
O&M	$290	
Total adverse effects	$4,810	$15,750
Net beneficial effects	$19,820	-$17,450

1/ Average annual values based on 100 years @ 6 7/8 percent interest

HIGINBOTHAM BROOK WATERSHED

SELECTED PLAN

REGIONAL DEVELOPMENT ACCOUNT

Components	Measures of Effects	
	State of New York	Rest of Nation
Employment:		
Beneficial effects:		
A. Increase in the number and types of jobs		
1. Induced employment in storage and processing of vegetables and related activities		--
2. Employment during project construction		1.1 man-years of semiskilled labor during project construction
3. Employment for project O&M		0.1 man-years per year of unskilled labor
Total beneficial effects		0.1 man-years of semiskilled employment 1.1 man-years of semiskilled labor during project construction

HIGINBOTHAM BROOK WATERSHED

SELECTED PLAN

SOCIAL WELL-BEING

Components	Measures of Effects
Beneficial and adverse effects:	
A. Life, health and safety	1. Reduction of flooding will enhance the life style and improve the health and safety of the people living in the village of Oneida

WATERSHED WORK PLAN AGREEMENT

between the

CITY OF ONEIDA
MADISON COUNTY SOIL AND WATER CONSERVATION DISTRICT
MADISON COUNTY BOARD OF SUPERVISORS

(hereinafter referred to as the Sponsoring Local Organization)

State of New York

and the

Soil Conservation Service
United States Department of Agriculture
(hereinafter referred to as the Service)

Whereas, application has heretofore been made to the Secretary of Agriculture by the Sponsoring Local Organization for assistance in preparing a plan for works of improvement for the Higinbotham Brook Watershed, State of New York, under the authority of the Watershed Protection and Flood Prevention Act (P.L. 566, 83d Congress; 68 Stat. 666), as amended; and

Whereas, the responsibility for administration of the Watershed Protection and Flood Prevention Act, as amended, has been assigned by the Secretary of Agriculture to the Service; and

Whereas, there has been developed through the cooperative efforts of the Sponsoring Local Organization and the Service a mutually satisfactory plan for works of improvement for the Higinbotham Brook Watershed, State of New York, hereinafter referred to as the watershed work plan, which plan is annexed to and made a part of this agreement;

Now, therefore, in view of the foregoing considerations, the Sponsoring Local Organization and the Secretary of Agriculture, through the Service, hereby agree on the watershed work plan, and further agree that the works of improvement as set forth in said plan can be installed in about 3 years.

It is mutually agreed that in installing and operating and maintaining the works of improvement substantially in accordance with the terms, conditions, and stipulations provided for in the watershed work plan:

1. The Sponsoring Local Organization will acquire, with other than P.L. 566 funds, such landrights as will be needed in connection with the works of improvement. (Estimated Cost $9,500).

2. The Sponsoring Local Organization assures that comparable replacement dwellings will be available for individuals and persons displaced from dwellings, and will provide relocation assistance advisory services and relocation assistance, make the relocation payments to displaced persons, and otherwise comply with the real property acquisition policies contained in the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Public Law 91-646, 84 Stat. 1894) effective as of January 2, 1971, and the Regulations issued by the Secretary of Agriculture pursuant thereto. The costs of relocation payments will be shared by the Sponsoring Local Organization and the Service as follows:

	Sponsoring Local Organization (percent)	Service (percent)	Estimated 1/ Relocation Payment Costs (dollars)
Relocation Payments	14.1	85.9	0

1/ Investigation has disclosed that under present conditions the project measures will not result in the displacement of any person, business, or farm operation. However, if relocations become necessary, relocation payments will be cost-shared in accordance with the percentages shown.

3. The Sponsoring Local Organization will acquire or provide assurance that landowners or water users have acquired such water rights pursuant to state law as may be needed in the installation and operation of the works of improvement.

4. The percentages of construction costs of structural measures to be paid by the Sponsoring Local Organization and by the Service are as follows:

Works of Improvement	Sponsoring Local Organization (percent)	Service (percent)	Estimated Construction Cost (dollars)
Floodwater Retarding Structure	0	100	$175,800

5. The percentages of the engineering costs to be borne by the Sponsoring Local Organization and the Service are as follows:

Works of Improvement	Sponsoring Local Organization (percent)	Service (percent)	Estimated Engineering Costs (dollars)
Floodwater Retarding Structure	0	100	28,100

6. The Sponsoring Local Organization and the Service will each bear the costs of Project Administration which it incurs, estimated to be $3,500, and $24,600 respectively.

7. The Sponsoring Local Organization will obtain agreements from owners of not less than 50 percent of the land above each reservoir and floodwater retarding structure that they will carry out conservation farm or ranch plans on their land.

8. The Sponsoring Local Organization will provide assistance to landowners and operators to assure the installation of the land treatment measures shown in the watershed work plan.

9. The Sponsoring Local Organization will encourage landowners and operators to operate and maintain the land treatment measures for the protection and improvement of the watershed.

10. The Sponsoring Local Organization will be responsible for the operation and maintenance of the structural works of improvement by actually performing the work or arranging for such work in accordance with agreements to be entered into prior to issuing invitations to bid for construction work.

11. The costs shown in this agreement represent preliminary estimates. In finally determining the costs to be borne by the parties hereto, the actual costs incurred in the installation of works of improvement will be used.

12. This agreement is not a fund obligating document. Financial and other assistance to be furnished by the Service in carrying out the watershed work plan is contingent on the availability of appropriations for this purpose.

    A separate agreement will be entered into between the Service and the Sponsoring Local Organization before either party

initiates work involving funds of the other party. Such agreement will set forth in detail the financial and working arrangements and other conditions that are applicable to the specific works of improvement.

13. The watershed work plan may be amended or revised, and this agreement may be modified or terminated, only by mutual agreement of the parties hereto.

14. No member of or delegate to congress, or resident commissioner, shall be admitted to any share or part of this agreement, or to any benefit that may arise therefrom; but this provision shall not be construed to extend to this agreement if made with a corporation for its general benefit.

15. The program conducted will be in compliance with all requirements respecting nondiscrimination as contained in the Civil Rights Act of 1964 and the regulations of the Secretary of Agriculture (7 C.F.R. 15.1-15.12), which provide that no person in the United States shall, on the ground of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any activity receiving federal financial assistance.

16. This agreement will not become effective until the Service has issued a notification of approval and authorizes assistance.

Madison County Board of Supervisors
Local Organization

By Joseph O. Henry

Title Chairman Board

Wampsville N. Y. 13163
Address Zip Code

Date 12/12/74

The signing of this agreement was authorized by a resolution of the governing body of the Board of Supervisors
Local Organization
adopted at a meeting held on Dec. 11, 1974

Cecelia S. Paone
Secretary, Local Organization

Wampsville, N. Y. 13163
Address Zip Code

Date Dec. 12, 1974

Madison County Soil and Water Conservation District

Local Organization

Farm & Home Center, Morrisville, N.Y. 13408

Address Zip Code

By William H. Rodda

Title Chairman

Date Dec. 11, 1974

The signing of this agreement was authorized by a resolution of the governing body of the Madison County Soil and Water Conservation District

Local Organization

adopted at a meeting held on August 21, 1974

John A. Vaughan

Secretary, Local Organization

Farm & Home Center, Morrisville, N. Y. 13408

Address Zip Code

Date Dec. 11, 1974

City of Oneida

Local Organization

109 N. Main St., Oneida, N.Y. 13421

Address Zip Code

By Herbert D. Brewer

Title Mayor

Date Dec. 13, 1974

The signing of this agreement was authorized by a resolution of the governing body of the Common Council of the City of Oneida

Local Organization

adopted at a meeting held on December 10, 1974

Myrna K. Arendash

Secretary, Local Organization

109 N. Main St., Oneida, N. Y. 13421

Address Zip Code

Date December 12, 1974

Appropriate and careful consideration has been given to the environmental aspects of this project.

Soil Conservation Service
United States Department of Agriculture

Approved by:

Robert L. Hilliard

State Conservationist

December 13, 1974

Date

WATERSHED WORK PLAN

HIGINBOTHAM BROOK WATERSHED

Madison County, New York

Prepared Under the Authority of the Watershed Protection and Flood Prevention Act (Public Law 566, 83d Congress, 68 Stat. 666), as amended.

Prepared by: Madison County Board of Supervisors
Madison County Soil and Water Conservation District
City of Oneida

With assistance by:

U. S. Department of Agriculture, Soil Conservation Service
U. S. Department of Agriculture, Forest Service

March 1974

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SUMMARY OF PLAN

Higinbotham Brook Watershed, located in the city of Oneida, Madison County, New York, is comprised of an area of 1,030 acres. The Sponsoring Local Organization of this urban watershed includes the Madison County Soil and Water Conservation District, Madison County Board of Supervisors, and the city of Oneida.

Soil erosion problems exist on 80 acres of land not "adequately treated," as defined by the Soil Conservation Service. These areas include 50 acres of cropland on Lairdsville soils, 15 acres of steep forest and poorly managed pastureland, and 15 acres in scattered locations.

Beginning at the 2-year frequency level, up to 36 acres of land are subject to periodic inundation. Seventeen acres are open land, serving primarily as wildlife habitat, and the remaining 19 acres are residential development. The June 1958 flood, considered to be a 20-year frequency event, caused an estimated $54,000 (1974 dollars) damage to residences, streets, yards, and streambank. Estimated average annual floodwater damages are $20,100. Indirect flood damages such as cost of rerouting traffic and damages to public utilities, amount to $4,200 annually.

This plan provides for accelerated technical assistance for the installation of land treatment measures and for the installation of one single-purpose floodwater retarding structure. All measures are expected to be installed in a 3-year period.

Installation of the land treatment measures as outlined in this plan, will reduce soil losses on cropped Lairdsville soil from 3.2 to less than 2 tons per acre. Sediment yields to the flood plain will be reduced by 77 percent. Silt concentration will be reduced from 120 mg/l to 39 mg/l.

Installation of the floodwater retarding structure will reduce flood damages by 80 percent. Discharges for the 100-year frequency event at Seneca Street will be reduced from 821 to 304 cubic feet per second and expected flood stages will be reduced by 1.1 feet.

Due to construction of the floodwater retarding structure, 2.5 acres of forest and 0.5 acre of open land formerly cropped will be changed to 2 acres of open water and one acre of dam and spillway. Eleven acres in the flood pool, consisting of 3.5 acres of forest, 4.5 acres of open land formerly cropped, 2 acres of pasture, and one acre of the golf course, will revert to low intensity use because of periodic inundation. The planting of 100 acres of trees will create additional forest wildlife habitat with a concurrent loss of agricultural wildlife habitat.

The Madison County Soil and Water Conservation District will be responsible for planning land treatment measures. Landowners and operators, with assistance furnished by the Soil Conservation Service and the Forest Service, will be responsible for establishing and maintaining these practices. The Higinbotham Brook Small Watershed Protection District, to be established by the Madison County Board of Supervisors, will provide land rights, and the Soil Conservation Service will provide engineering services required for the installation of the structural measure. The Small Watershed Protection District and the Service will bear project administration costs that each incurs.

Total installation cost of the combined land treatment and structural measure is $284,450. Of this amount $244,400 will be funded by Public Law 566 and $40,050 will be paid for by other funds. Total land treatment cost is $42,950, including $15,900 from P.L. 566 funds for technical assistance and $27,050 from other funds. Total structural measure cost is $241,500, including $228,500 from P.L. 566 funds and $13,000 from other funds. The average annual operation and maintenance costs of $900 will be borne by the city of Oneida and will be financed through regular appropriations.

The average annual cost of the structural measure is estimated to be $17,600. This measure is expected to produce average annual benefits, excluding secondary benefits, of $19,970 or $1.14 for each dollar of cost. The ratio of the total average annual project benefits ($21,670) to the average annual cost of structural measures ($17,600) is 1.2 to 1.0.

All information and data, except as otherwise noted by reference to source, were collected during watershed planning investigation by the Soil Conservation Service, U. S. Department of Agriculture.

WATERSHED RESOURCES - ENVIRONMENTAL SETTING

PHYSICAL DATA

Higinbotham Brook Watershed (1,030 acres in size), is located in Madison County in central New York (Figure 1). The entire watershed is within the corporate limits of the city of Oneida (population 11, 660), approximately 25 miles east of the city of Syracuse (population 197,210). Madison County is part of the Syracuse Standard Metropolitan Statistical Area.

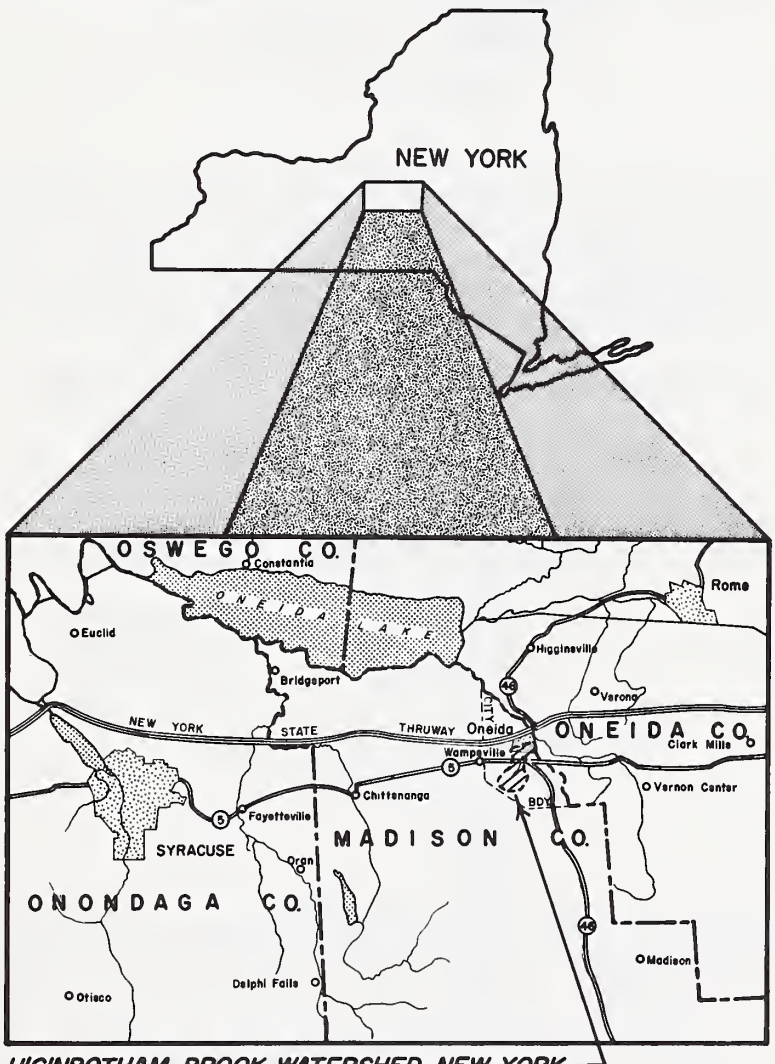


FIGURE 1 - WATERSHED LOCATION MAP

FIGURE 2 - GREAT LAKES WATER RESOURCE REGION

The watershed is located within the Water Resources Council's Great Lakes Water Resource Region and the Southeastern Lake Ontario Subregion. (See Fig. 2, Great Lakes Water Resource Region Map.) Table A illustrates present and projected populations and per capita incomes for the region, subregion, and Higinbotham Brook Watershed.

TABLE A - WATER RESOURCE REGION PROJECTIONS

Year	Great Lakes[1/] Region	POPULATION: Southeastern Lake[1/] Ontario Subregion	Higinbotham Watershed
1970	28,853,156	934,945	1,500
1980	33,727,400	1,096,000	1,758
2000	44,050,800	1,265,400	2,030
	PER CAPITA INCOME (1967 $)		
1970	3,826	3,162	2,971[2/]
1980	5,241	4,493	4,221
2000	8,932	7,998	7,515

1/ U. S. Water Resources Council: 1972 OBERS Projections - Regional Economic Activity in the U. S., Vol. 3, Water Resource Regions 1-8, U. S. Government Printing Office, Washington, D. C.

2/ U. S. Bureau of the Census: Census of Population: 1970 General, Social and Economic Characteristics, Final Report, Pc(1)-C 34 New York, Oneida; U. S. Government Printing Office, Washington, D. C.

Higinbotham Brook Watershed is within the Ontario-Mohawk Land Resource Area of the Lake States Fruit, Truck and Dairy Land Resource Region (2). The watershed is located in the Allegheny Plateau and Erie-Ontario Physiographic Province (4).

The primary soil and water resource problem is due to floodwater which occasionally inundates up to 36 acres, including 19 acres of residential development and 17 acres of open land. In past floods, 2 houses have sustained first floor damages; 10 houses, basement damage; 16 houses, yard damage; and 2 schools, yard damage. Damages from sediment and bedload deposition have occurred to streets and bridges.

Erosion damage is evident in upland areas of the watershed where steep topography, improper land use, overgrazing, and urban development have limited or destroyed ground cover. Wildlife habitat resources are inadequate, due to a lack of evergreens and shrubby vegetation.

The climate of the watershed is humid continental (11). The temperature ranges from 90 degrees to -20 degrees Fahrenheit. Summers are relatively cool with temperatures averaging about 65 degrees from May through September. Average annual precipitation is about 40 inches (5), with about 45 percent falling during the 140-day growing season.

The ground water resources of this watershed are not utilized, as city of Oneida water supply is available. The ground water is of acceptable quality for domestic use. The mineral resources are limited to localized sand and gravel deposits.

The city of Oneida water system serves more than 17,000 people within the city and the surrounding area. Water is obtained from a surface reservoir located on Florence Creek, near the village of Glenmore, in Oneida County. Water is carried via an aqueduct to Baker Reservoir near the city of Oneida. The system is designed to provide a safe yield of 3.5 million gallons per day. Safe yield is defined as the maximum dependable draft which can be made continuously upon a source of water supply, during a period of years during which the probable driest period, or period of greatest deficiency in water supply, is likely to occur (25).

The watershed contains no wetlands as defined in "Wetlands of the United States", Department of the Interior, Fish and Wildlife Service, Circular C-39, (19).

Soils of the upland occur on moderately steep slopes and are moderately well to well drained. These were formed in glacial till from soft shale parent material. Soils of the Lairdsville series predominate. There are minor areas of well drained soils formed in glacial outwash. On the flatter lands in the northern part of the watershed, the soils are formed principally in well drained glacial outwash. They consist primarily of soils of the Wampsville, Howard, and Palmyra series. Associated with them, but occurring on the nearly level areas, are soils formed in alluvial deposits. Teel is the most extensive of these soils. (See Appendix B, Soils of Higinbotham Watershed.)

Soils have been grouped by land use into land capability subclasses. (See Table B.) Land capability classification (20) is a system by which soils are grouped together by classes and subclasses, based upon their limitations and hazards for agricultural use. Capability classes are designated by Roman numerals, with limitations in use becoming progressively greater from Class I to Class VIII. Capability subclasses are a grouping of soils having similar kinds of limitations and hazards. Four general kinds of limitations or hazards are recognized: (1) e, erosion hazard, (2) w, wetness, (3) s, rooting zone limitations, and (4) c, climate.

Forests are predominantly northern hardwoods (6), and are classified as pole stands. A high percentage of the sawtimber present is of low quality. Over 50 percent of the forested area is steep Lairdsville soil. This soil tends to be droughty, is severely eroded, and extremely hazardous for equipment operation due to the topography. Other wooded areas include lesser sloping Lairdsville soils and bottom land consisting of Wayland soils.

Elevations range from 830 feet m.s.l. (mean sea level) at the southern divide to 420 feet m.s.l. at the confluence of the stream with Oneida Creek. (See Project Map, Appendix A.) The southern portion of the watershed is characterized by rolling topography; whereas, the northern portion has relatively flat topography.

Bedrock in the southern portion consists of soft reddish or greenish Vernon shale at depths of 1.5 to 3.5 feet in most areas. Exposures of shale are common on very steep hillsides and along dissecting drainageways. In the northern portion, bedrock consists of dolomite of the Lockport group at depths of 6 feet or more.

TABLE B - PRESENT LAND USE

Land Use 1/	CAPABILITY SUBCLASS I Acres	IIe Acres	IIw Acres	IIIe Acres	IIIw Acres	IVe Acres	Vw Acres	VIe Acres	VIIe Acres	Total
Cropland	0	61	49	11	-	84	-	12	-	217
Open land formerly cropped	9	11	43	3	31	59	-	29	43	228
Pastureland	-	15	14	2	-	30	4	50	11	126
Forest land	-	-	11	-	6	11	-	10	47	85
Urban land	106	57	85	12	4	20	-	-	-	284
Other land	34	-	13	-	-	43	-	-	-	90
TOTAL	149	144	215	28	41	247	4	101	101	1,030

1/ Cropland - Land which is used for row crop, close-grown field crops, fallow, rotation hay and pasture, and hayland.
Open land formerly cropped - Land which formerly had grown agricultural crops but is now undergoing natural plant succession.
Pastureland - Land producing forage plants for animal consumption.
Forest land - Land at least 10 percent stocked or formerly stocked by forest trees, noncommercial trees, and afforested (plantations) areas.
Urban land - Built-up areas, industrial and commercial sites, etc.
Other land - Includes farmsteads, farm roads, feedlots, ditch banks, fence and hedgerows, marshes, and recreation areas.

Records from "Earthquake History of United States, Part I" indicate that the area was shaken at least eight times during the past 300 years, by major earthquakes having epicenters to the north in Seismic Risk Zone 3, the St. Lawrence Valley region. The most recent of these occurred at Attica, New York, in 1929 and at Massena, New York, in 1944. The damage ratings are based on damage to existing rigid structures (7).

Higinbotham Brook drainage begins about one mile south of Seneca Turnpike. In the upper reaches, the channel exists under natural conditions. Flowing in a northerly direction, it passes under Seneca Turnpike and enters underground twin 54 inch diameter concrete conduits. (See Urban Flood Plain Map, Appendix A.) The conduits carry the flow past the high school, ending near the former New York Central Railroad. From the railroad, the flow is carried by an open modified ditch to Sylvan Street, where it makes a sharp turn to flow eastward through the residential area. The flow is restricted at Sylvan Street by a 36 inch diameter culvert. From Sylvan Street to Franklin Street, the stream flows in an open modified channel. From Franklin Street to Seneca Street, it passes under the school playground through a 3 foot by 6 foot underground conduit. From Seneca Street to Route 46, it flows via an open modified channel to enter an underground conduit at Route 46. The stream outlets the conduit one block east of Route 46, passes under the O&W Railroad, and flows into Oneida Creek.

In the upper reach (5,000 feet long), the stream averages 6 feet wide and 4 inches deep. The bottom material is comprised of bedrock, gravel, and sand. Pools which provide adequate cover for protection of fish are absent.

The velocity of the stream in the lower reach decreases due to the flat topography. Conduits and culverts comprise 2,000 feet of the total stream reach. Pools averaging 13 inches in depth, represent 20 percent of the open stream (5,000 feet). Riffles averaging 5 inches in depth, comprise the remaining 80 percent. Average width of the stream is 7 feet, with vegetative shade covering 62 percent of the stream at midday. Bottom material is comprised of sand and gravel.

Higinbotham Brook flows intermittently during the summer months. Pools, at this time, dry up or become stagnant water areas of less than one foot of depth. This limits the fish population to a low quality minnow type of longnose dace and creek chub. Low flows and the abundance of culverts restrict this stream from providing a spawning area for species of Oneida Creek.

Reptile and amphibian species with ranges extending throughout the watershed are listed in Appendix B.

Higinbotham Brook is classified by the New York State Department of Environmental Conservation as suitable for "agricultural or source of industrial cooling or process water supply or any other usage except for fishing, bathing, or as a source of water supply for drinking, culinary, or food processing purposes (Class D)."

The conditions related to the best usage of a Class D stream are as follows: "The waters will be suitable for fish survival; the waters, without treatment and except for natural impurities which may be present, will be satisfactory for agricultural usages or for industrial process cooling water; and with special treatment, as may be needed under each particular circumstance, will be satisfactory for other industrial processes (13)." No well defined pollution sources or problems were encountered.

ECONOMIC DATA

The watershed is located in a major industrial, transportation, and population belt of the state. The New York State Thruway passes to the north of the city of Oneida, and New York State Route 5 passes through the watershed. The watershed is within 25 miles of the major urban centers of Syracuse, Utica, and Rome. (See Figure 1, page 4.) An estimated 1,500 persons live in this urban watershed.

Eighteen moderately priced residences and two schools are located in the flood hazard area. The current land use pattern in the flood problem area is quite stable with no evidence that it will change in the future.

Most of the land in the watershed is privately owned. Public ownership is limited to schools, the hospital, and the 5 acres of forest land around the city of Oneida's Baker Reservoir.

Dairying is the only agriculture enterprise. Corn for silage which yields about 18 tons per acre, and hay which yields about 3 tons per acre, are the principal crops grown. Seven farms are wholly or partly located in the upland portions of the watershed, and vary in size from about 60 to 200 acres. Current prices of land are high due to the influence of residential development; prices range from one to several thousand dollars per acre.

Poor quality of the present forests and the expected continuation of urban expansion, make it unlikely that forest products will ever be harvested. One possible exception may be local sales of fireplace wood.

The economy of Oneida is related to light industry, and there is commuting to nearby industrial and commercial jobs. The city has provided facilities to handle expansion, including adequate water supplies, streets, shopping areas, and land for development. The unemployment rate for the Syracuse Metropolitan Statistical Area was 4.5 percent in November 1972 (14). Current and projected population and per capita income are shown on Table A, page 5.

This watershed is in the South Central New York Resource Conservation and Development Project Area. Resource Conservation and Development Projects are initiated and carried out by local people, with the assistance of agencies of the states, and agencies of the United States Department of Agriculture.

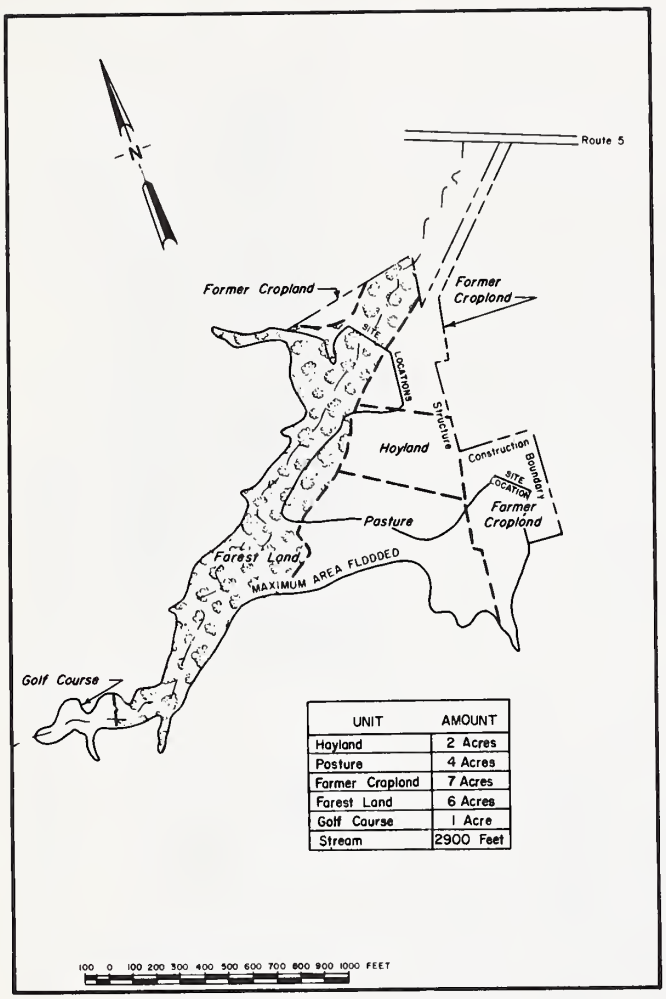
WILDLIFE RESOURCES

Wildlife resources are similar to those found in Southeastern Lake Ontario Subregion. The majority of agricultural land wildlife habitat resources are found on land formerly cropped. Herbaceous vegetation (annual and perennial weeds and grasses), interspersed with a variety of woody plants, provides both food and cover. Wildlife species identified in Table C are typically associated with agricultural land uses. Deer are occasionally seen grazing in the fields; however, they are considered as forest wildlife whose main habitat exists outside of the watershed.

The 17 acres of open land in the urban area subject to periodic inundation, has a good distribution and variety of shrubs, weeds, grasses, and trees (mostly willow and a few pine). The successional stage of this area is more advanced than that of the remaining land formerly cropped; consequently, this area supports a higher density of agricultural land wildlife species than upland agricultural habitat areas.

There are approximately 32 acres of mature hardwood stands and 53 acres of tree and shrubby cover in the southern portion. Watershed woodland wildlife species are limited to gray squirrels, red squirrels, gray foxes, and songbirds by woodlot size (12 acres or less) and woodland composition (deciduous northern hardwoods).

Present land use of the potential impoundment site is found on Figure 3. This area represents 2 percent of the watershed and can be correlated with existing plant and wildlife communities shown in Table C.



Public hunting is limited due to landownership patterns. Bird watching and observation of other wildlife species are major uses of wildlife resources.

Rare and endangered species of New York State are listed in the publication, "Rare and Endangered Fish and Wildlife of the United States," U.S. Bureau of Sport Fisheries and Wildlife 1966 Edition. Investigations indicate that no species listed in this publication are in or near the watershed.

FIGURE 3

WILDLIFE HABITAT AT POTENTIAL IMPOUNDMENT SITE

RECREATIONAL RESOURCES

A public golf course is located in the upper portion of the watershed and comprises an area of 50 acres. Other recreational facilities include playground equipment at the two schools located in the urban area.

TABLE C - PLANT COMMUNITIES AND WILDLIFE SPECIES BY LAND USE

Present Land Use	Acres	Plant Communities	Wildlife Species For Which Habitat is Provided
Agricultural Land			
Cropland	217	Grasses and legumes - alfalfa and timothy Grains - corn (less than 40 percent)	Cottontail rabbits, raccoons, skunks, red fox, woodchuck, weasels, opossums, ringneck pheasant, songbirds, birds of prey and small mammals. 1/
Pastureland	126	Domestic grasses - bluegrass and timothy Native plants - Canada thistle, dandelion, bull thistle, crabgrass, and quack grass	Some forage for deer.
Open land formerly cropped	228	Herbaceous - wild grasses and annual and perennial weeds - goldenrod, bristly foxtail, crabgrass, curled dock, late purple aster, etc. Woody vegetation - shrubs such as dogwood, thornapple, raspberries, and sumac	
Woodland			
Trees and shrubs	53	Mature trees of the northern hardwood association - beech, birch, maple, ash, and oak Shrubs such as dogwood, sumac, elderberry, raspberry, etc.	Small size woodlots limit habitat to red and gray squirrels, gray fox, and songbirds, and small mammals. 1/ They also provide cover for raccoons, skunks, weasel, and opossums
Mature woodlots	32	Trees of the northern hardwood association - beech, birch, maple, ash, oak, hemlock, and hophornbeam	
Urban Land	284	Domestic grasses, ornamental trees and shrubs	Songbirds and small mammals 1/
Other (Roads, streets, etc.)	90	None	None

1/ See Appendix B for species listing.

ARCHEOLOGICAL AND HISTORICAL VALUES AND UNIQUE SCENIC AREAS

Investigations conducted by the Kirkland College's Archeological Department indicate that there are no historical or archeological materials or data in the watershed. The National Register of Historic Places lists no properties in the watershed such as historic districts, sites, buildings, structures, or objects which are significant in American history, architecture, archeology, and culture.

SOIL, WATER AND PLANT MANAGEMENT STATUS

Several trends are apparent in land use changes: one is the shift from cropland to open land formerly cropped; the second is a change of about 10 acres annually from open land formerly cropped to urban development; and third, open land formerly cropped and pastureland is shifting, through natural succession, from herbaceous to woody vegetation and eventually to forest land. Projected future land use is shown in Table D.

TABLE D - FUTURE LAND USE (2000)

Land Use	Acres	Percent
Open land formerly cropped	145	14.1
Forest land	285	27.7
Other land	100	9.7
Urban and built-up	500	48.5
TOTAL	1,030	100.0

About 84 acres of capability subclass IVe cropland, and 12 acres of capability subclass VIe pastureland, are considered marginal. Factors of production (land, labor, and capital) are being employed inefficiently as returns to these inputs are relatively low. Insufficient capital is being invested in the 91 acres of pastureland, resulting in low returns to land and labor inputs.

The Madison County Soil and Water Conservation District has been conducting intensive programs of land use planning and installing land treatment measures. Seventy percent of the operators and 73 percent of the land area within the watershed are under district cooperator agreements. All of the 15 cooperators have basic conservation plans and about 75 percent of planned conservation practices have been applied.

Land "adequately treated" includes 133 acres of cropland, 90 acres of pastureland, 90 acres of other land, and 223 acres of urban land. Land adequately treated is defined as land on which all planned improvements have been applied.

About 950 acres in the watershed are adequately protected. Land "adequately protected" is defined as land on which the soil, water, and related plant resources are adequately protected from deterioration, either naturally or by action of the land user.

Forest fire protection is provided by the city of Oneida and local volunteer fire departments. There have not been any forest fires within the watershed during the last 5 years. The present protection system is considered adequate.

State-Federal Cooperative Forestry Programs presently providing assistance in the area include: Cooperative Forest Management (CFM), Cooperative Forestation (CM-4), and Cooperative Forest Insect and Disease Control.

WATER AND RELATED LAND RESOURCE PROBLEMS

LAND TREATMENT

About 80 acres of the watershed are not adequately protected; consequently, erosion rates on these areas are in excess of maximum allowable rates defined by the Soil Conservation Service. These areas include 15 acres of specific problem areas as shown in the "Erosion Damage" section (page 17); 15 acres of scattered areas; and 50 acres of cropland which experience soil losses in excess of 2 tons per acre. All of these areas are primarily Lairdsville soils.

About 10 acres of open land being converted to urban use each year are stripped of vegetation annually for construction and other development. About 5 acres have soil losses as shown in the "Erosion Damage" section (page 17).

About 12 acres of capability subclass VIe cropland and 11 acres of VIIe pastureland are being used beyond their capabilities because of erosion hazards. See Table B (page 8) for additional information.

FLOODWATER DAMAGE

Flood damages begin at the 2-year frequency event 1/. Thirty-six acres, including 19 acres of residential development, and 17 acres of open land serving primarily as wildlife habitat, are subject to flood damage. (See Urban Flood Plain Map.) Damages from the 2-year to 5-year frequency flood events are limited to residential basements, garages, streets, and yards. Additional residential damages (including first floor) result from larger floods. A 100-year frequency flood event would damage 18 residences, (estimated value $360,000) in addition to streets and yards.

The June 1958 flood, considered to be a 20-year frequency flood event, caused an estimated $54,000 (1974 dollars) damage to residences, streets, yards, and streambank. Estimated average annual

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1/ A 2-year frequency flood is the peak discharge expected to be equaled or exceeded 50 times during a 100-year period or which has a 50 percent chance of occurrence during a given year.

urban floodwater damages are $20,100. Indirect flood damages such as costs of rerouting traffic and damages to public utilities amount to $4,200 annually.

EROSION DAMAGE

Erosion, or the wearing away of land surface by running water, wind, ice, or other geological agents, is present throughout the watershed. Most of the high rates of erosion occur in the upland areas as a result of poor management, steep topography, cultural operations, and highly erosive soils. Erosion in the flat sections of the watershed is occurring, but at a very low rate. Sheet erosion is the removal of a fairly uniform layer of soil from the land surface by runoff water. Rill erosion is an erosion process in which numerous small channels only several inches deep are formed, and occurs mainly on recently cultivated soils (17).

Erosion rates for sheet and rill erosion are as follows:

Land Use	Range of Erosion Rates tons/acre/year
Cropland	1.00 - 3.20
Open land formerly cropped	.17 - .21
Pastureland	.17 - 2.20
Forest land	.10 - .74
Other (includes present urban and built-up not under construction)	.07 - 1.30

Rates for other erosion types in the watershed are as follows:

Erosion Type	Rate/Year
Gully	16.50 tons
Streambank	71.60 tons
Roadbank	.12 tons
Urban Construction	24.00 tons/acre

Gully erosion, a process whereby water accumulates in narrow channels and over short periods, removes the soil from this narrow area to considerable depths, ranging from 1 to 2 feet to as much as 75 to 100 feet (17).

Critical sediment source areas in the watershed are associated with excessive sheet and streambank erosion. Values for sheet erosion, which deviate greatly from the normal range, along with the acreages involved are:

Land Use	Acreage	Erosion Rate tons/acre/year
Steep, forest land	1.5	61.0
Poorly managed pasture	1.0	22.2
Steep grazed forest land	12.5	10.7

Streambank erosion along approximately 1,080 feet of stream channel is currently in an active state. This condition is present from the upland area above the proposed structure down to the point where the brook enters the culvert at Sylvan Street. The erosion is present along the main stem, as well as the tributaries. Streambank erosion represents approximately 30 percent of the total erosion within the watershed. There are no areas of flood plain scour.

In its upland channel sections, the stream is advancing and deepening its course by headward erosion and downward recession, similar to gully-type erosion. About 15.5 tons of material are eroded annually because of this activity. This erosion rate is expected to diminish rapidly as the incisive process reaches resistant bedrock and as the channel approaches the watershed boundary.

SEDIMENT DAMAGE

Sediment damage in the watershed is limited to accumulation of bedload materials in bridges and culverts and costs about $800 per year for cleanout. (See Table 5.) Sediment concentration is estimated to be approximately 120 milligrams per liter (mg/l), based on sediment yields of 350 tons per year at the mouth of the watershed. The size and texture of sediment reaching Oneida Creek is primarily fine-grained silts and clays. Discoloration of the water in Oneida Creek for a short distance downstream from the mouth of the brook occurs during peak flows.

WILDLIFE

Agricultural wildlife habitat is being reduced as cropland and open land formerly cropped is gradually being converted to urban and forest land. Total agricultural wildlife habitat is about 571 acres presently, and will be about 145 acres by the year 2000. Wildlife species utilizing this type of habitat are identified on Table C (page 13). Shrubby and evergreen cover for wildlife throughout the watershed is currently in short supply, especially in the southern portion; however, land use trends will gradually alleviate this situation.

Periodic inundation of the 17-acre open land wildlife habitat area within the urban area results in sediment deposition on grasses and other forages, and drowned nestlings. Wildlife species are temporarily forced out of the area by floods.

ECONOMIC AND SOCIAL

The watershed farms are all family-type low income producing units. Agriculture is passing through stages common to urban fringes and is not a major factor in the economy. Most of the business and social activities take place in the city of Oneida. See Table A (page 5) for population and per capita income data.

PROJECTS OF OTHER AGENCIES

There are no known water resource development project proposals by county, state, or federal agencies that will affect, or be affected by, proposed project measures.

PROJECT FORMULATION

The sponsors filed an application for assistance under Public Law 566 (P.L. 566) in February 1959, and planning was authorized September 11, 1959. The city of Oneida requested planning be terminated in March 1962. Planning was terminated December 13, 1963.

The city of Oneida initiated a letter of intent to apply for P.L. 566 planning assistance as outlined in Office of Management Budget Circular No. A-95 on November 4, 1970. Planning was reauthorized on October 27, 1971. Written notices were sent to all interested federal, state, and local agencies on November 1, 1971, notifying them of the reauthorization for planning.

The following are dates of local meetings, involving local citizens, city council, news media, and others, held on this watershed to develop objectives, alternatives and discuss impacts:

March 12-13, 1959	August 26, 1970
April 27, 1959	September 15, 1970
June 3, 1959	October 21, 1970
September 25, 1959	February 11, 1971
November 24, 1959	October 6, 1971
January 13, 1960	September 28, 1972
July 1, 1960	

The planning of this watershed has been coordinated with the New York State Office of Parks and Recreation regarding the historical and archeological aspects of the project resulting in a detailed archeological investigation of the proposed structural site. Personnel of the Bureau of Sport Fisheries and Wildlife, United States Department of the Interior, and the New York State Department of Environmental Conservation made a reconnaissance of the project area with Soil Conservation Service personnel, to coordinate the fish and wildlife aspects of the project. The Environmental Protection Agency has provided an assessment of the water quality aspects of the proposed project, and advised Soil Conservation Service personnel during project formulation.

This watershed lies within the Oswego River Basin drainage area that has been studied under a Type IV River Basin Study. This watershed was considered in the coordinating committee's report and identified for early action.

OBJECTIVES

Specific objectives agreed to as shown in the request for planning reauthorization, dated September 16, 1971, are as follows:

1. To provide an economically feasible program to alleviate floodwater damages in the densely populated urban area of the city of Oneida.

2. To reduce erosion to allowable rates and reduce sediment deposition in the channel.

ENVIRONMENTAL CONSIDERATIONS

Potential adverse impacts recognized in the formulation of this project, and considerations given to minimize their effects include:

1. Displacement of people or businesses would be necessary to achieve 100-year level of protection. The sponsors agreed to a level of protection less than 100-year.

2. Reduced flood stages may induce urban development in remaining flood prone areas. The sponsors agreed to restrict further development in the flood plain.

3. Destruction of wildlife habitat by possible urban development in the 17-acre open land. The sponsors agreed to restrict further development in the flood plain.

4. Destruction of wildlife habitat due to construction of the floodwater retarding structure. The dam and borrow area will be vegetated with desirable species of grasses and legumes, which have a high value for wildlife.

5. Short term erosion rates will be increased during construction. Erosion rates will be minimized by following strict guidelines during construction and adhering to state and local health requirements.

ALTERNATIVES

Alternatives to the project can be divided into two categories - nonstructural and structural. Many combinations of these categories are possible, including some which are not realistic. During the evaluation of alternatives, those which proved to be unworkable or impossible were not explored further.

NONSTRUCTURAL

Land Treatment Program

This alternative would provide technical assistance to review and make needed revisions of conservation and woodland plans; to maintain existing cover which is adequate and install essential land treatment measures; and to plan and apply land treatment measures applicable to land areas which require treatment.

The land treatment program would apply to all of the lands in the watershed. Conservation measures would be applied on cropland, pastureland, forest land, urban land, and other land as described under the "Works of Improvement to be Installed" section.

The cost of the land treatment program would be about $43,000. This alternative would improve the hydrologic condition of the watershed and reduce runoff from the 100-year frequency storm event by about 3.6 percent. Woodland wildlife habitat would be increased by about 100 acres.

The installation of vegetative and structural types of land treatment measures would effectively reduce runoff, conserve soil moisture, and prevent excessive losses of topsoil. The amount of sediment leaving the watershed would be reduced by 70 tons annually. Land treatment measures would enable landowners to better implement sound land management plans and increase efficiencies of production, increase wildlife habitat, and improve water quality.

This alternative would not meet the selected objectives of the sponsors. Although floodwater damages in the city of Oneida would be reduced, the resulting protection is not at the level desired. The erosion rates would be within the limits allowable for the proposed land use.

Land Treatment and Floodproofing

This alternative includes installation of land treatment measures and floodproofing (18).

The land treatment program would be the same as that described under the "Land Treatment Alternative" and the same costs and effects would be applicable.

Floodproofing of 18 flood plain residences would be required. Each residence would be evaluated by a technical team to determine its structural stability and the revisions and measures necessary to ensure its integrity during the onslaught of floodwaters from a 100-year frequency storm. Those residences, which lack adequate structural integrity, would be removed from the flood plain. Raising of houses, reinformcement of walls and foundations; installing cellar drain valves; sealing of walls, windows and floors; and similar measures would cost about $10,000 per residence. Total estimated cost would be about $180,000.

Future flood plain improvements would be restricted to those which would neither be susceptible to flood damage nor contribute to the flooding problem.

The floodproofing of existing structures would disrupt schedules and budgets of the homeowners and cause other inconveniences during the construction period. Neighborhood activities and local peace and tranquility would be disturbed.

Should any residences be removed from the flood plain, the owners and the neighbors in both the gaining and losing neighborhoods would experience psychological readjustments. The owners would incur personal expenses during the move and financial losses could result from the move.

This alternative would not meet the sponsors' objectives to provide a program of flood prevention in the urban area. Erosion rates in the upland areas would be reduced to acceptable limits.

Land Treatment and Flood Insurance

The land treatment phase of this alternative would be the same as that discussed under the "Land Treatment Alternative." The same costs and effects would apply to this alternative.

Implementation of this alternative would require that the city of Oneida apply and be approved as a participant in the National Flood Insurance Program administered by the Department of Housing and Urban Development. An evaluation of the urban area would be required to locate the properties affected and identify participants eligible for the insurance.

The city of Oneida would have to comply with provisions of the insurance program and adopt flood plain ordinances and institute any other regulations as required.

Enrollment as a participant in the program would be at the option of individual homeowners and the level of protection obtained in accordance with his own desires and the program guidelines.

Flood insurance would reimburse participants according to the program guidelines. Payments received would be program allocations applied to the properties and household items affected. The monies received by the participants would be available for their use to repair or replace the items affected and for cleanup, inconveniences, and any other indirect damages.

This alternative would not meet the sponsors' objectives to provide an effective program for flood prevention in the urban area.

STRUCTURAL ALTERNATIVES

Land Treatment and Stream Channel Modification

This alternative consists of land treatment, about 4,000 feet of channel modification, and replacement of undersized culverts.

The land treatment would be the same as that discussed under "Land Treatment Alternative" and costs and effects shown would apply.

The combination of the measures in this alternative would provide protection to the residential area from the 100-year frequency storm. The relocation of two residences would be required, and the increased efficiency of flow in the modified channel with adequate sized culverts would induce damages downstream from the work area.

Installation of the channel work and replacement of the culverts would create temporary interruption of traffic, and disruptions of electrical, telephone, and natural gas transmissions. The backyards abutting the channel would be disturbed during the construction peiod and the protective fence to be installed would alter the landscape along the channel. Stream and terrestrial habitat along the work area would be destroyed temporarily.

The relocation of the two residences would entail personal expenses by the owners and could result in a financial loss. The families and the gaining and losing neighborhoods would experience psychological readjustments. Activities at the gaining and losing residential sites could be disrupted during the relocations. Effects outside the neighborhoods could result from reallocations of energy supplies and revisions of utility installations.

Construction activities would produce temporary increases in noise levels, turbidity, and sediment concentrations in the stream, and dust and smoke pollution of the air.

This alternative would meet the sponsors' objectives of providing a flood prevention program in the residential area, but deviates in the sense that their stated objectives concern the areas further downstream as well. The relocation of the damage area to a point further downstream is not acceptable to the sponsors.

The estimated cost of this alternative is about $600,000.

NO PROJECT ALTERNATIVE

A final alternative is the so-called "do nothing" approach which would not make any changes in the existing environment. The watershed would essentially remain as outlined in the"Watershed Resource - Environmental Setting" section of this plan, and would still be plagued with problems that led to the initiation of this project. Although the Soil Conservation Service's on-going programs would continue to function, and provide technical assistance for the installation of land treatment and resource planning, it would not be at the accelerated rate. Both the adverse and favorable effects of the project would be eliminated. Erosion, sediment,and floodwater damage reductions would be foregone. Urban development of the flood plain with consequent increases in damageable values would continue. Net average annual monetary benefits foregone would total $4,070.

REASON FOR SELECTING PLANNED PROJECT

The project, as formulated, consists of a planned program of land treatment measures, and one floodwater retarding structure. Installation of this system, partially financed by P.L. 566 funds, is estimated to provide an 80 percent damage reduction. To provide complete damage reduction through the residential area would require channel and culvert modification. The sponsors desire that the channel be left "as is," with no disturbance of the residential area. The city engineer has agreed to replace existing culverts with the proper sizes, as replacement needs arise.

The planned project does not include recommendations for land use changes on capability subclass VIe cropland, and VIIe pastureland, as land use trends indicate less intensive uses of these areas during project life. Economic and social conditions are responsible for the expected losses of agricultural wildlife habitat, and land use regulation would be required to maintain agricultural production in the watershed.

WORKS OF IMPROVEMENT TO BE INSTALLED

LAND TREATMENT

The land treatment phase of the plan applies to each acre in the watershed. Landowners and operators will be encouraged to manage their lands to maintain adequate cover and existing treatment measures. They will also be encouraged to install conservation measures to meet problems in the watershed. Individuals will install these measures dependent upon their individual interests, their means to do so, and applicable state and local laws.

Technical assistance will be provided to plan land use changes, install needed conservation measures, manage watershed resources, and maintain conservation measures. Assistance will be given to planning and zoning boards, community leaders, and land developers in the proper use, treatment, and development of resources in the expanding urban area. General technical assistance will also be provided for environmental education and stimulation of landowners to participate in good land management practices.

Through consensus of the conservation district, community leaders, landowners, and state and federal agencies, it was agreed that adequate land treatment should be applied to 50 acres of cropland, 36 acres of pasture, 180 acres of forest, 28 acres of other land, and 80 acres of urban and built-up during the 3-year installation period (Table 1). Table E indicates planned types and estimated amounts of land treatment measures to be applied.

Wildlife habitat management practices will be interspersed throughout the watershed. These practices will be for the primary use of wildlife and include planting grasses, legumes, and shrubs; constructing watering facilities; and releasing apple trees and other valuable food plants.

TABLE E - LAND TREATMENT INSTALLATION

Land Treatment Measures 1/	Unit	Estimated Amounts
Cropland		
Conservation Cropping System	Acre	50
Contour Farming	Acre	50
Stripcropping	Acre	50
Crop Residue Management	Acre	25
Diversion	Feet	500
Pastureland		
Pasture and Hayland Management	Acre	36
Pasture and Hayland Planting	Acre	10
Critical Area Planting	Acre	1
Mulching	Acre	1
Forest Land		
Tree Planting	Acre	100
Forest Environmental Improvement	Acre	40
Woodland Grazing Control	Acre	40
Wildlife Upland Habitat Management	Acre	20
Urban and Other		
Urban Environmental Forestry	Acre	50
Critical Area Planting	Acre	15
Mulching	Acre	15
Diversion	Feet	500

1/ Definitions of Land Treatment Measures in Appendix B.

FIGURE 4 - TYPICAL FLOODWATER RETARDING STRUCTURE

STRUCTURAL MEASURES

One single-purpose floodwater retarding structure is planned. The design life is 100 years, at which time the capacity reserved for expected sediment accumulation will be expended. Thereafter, the capacity provided for floodwater detention will diminish as sediment accumulates. This structure will control about 0.8 square miles of drainage or 50 percent of the total watershed area. It is located southwest of the hospital, south of Route 5.

The earth fill dam is a 53 foot high, 250 foot long structure with two auxiliary dikes, a two-stage reinforced concrete drop inlet principal spillway, and a vegetated earth emergency spillway. (See Table 3 for the Structural Data.)

Flow will be controlled through an ungated, self-operating reinforced concrete conduit, which incorporates a two-stage principal spillway system that automatically controls runoff resulting from storms up to the 100-year frequency flood event. Flow resulting from storms greater than the 100-year frequency event will be routed safely around the dam through the emergency spillway. (See Appendix A, Typical Cross Section of Floodwater Retarding Structure.)

The structure will be fenced to prevent damage during the vegetation establishment period and the life of the project. The structure will provide capacity for a total of 22 acre-feet of submerged sediment, 4 acre-feet of aerated sediment, and 143 acre-feet of floodwater storage (3.35 inches). The floodwater detention storage will empty in less than 9 days after passage of the design storm. The sediment pool surface area will be approximately 2 acres and have a maximum initial depth of 29 feet. Three acres of light clearing will be required for the reservoir dam and spillway.

The foundation for the structure is stable bedrock, consisting of red and green Vernon shale. This material is either exposed or near the soil surface over most of the structure centerline. The abutments will be cleared of all weathered rock, prior to placement of embankment fill materials. The two auxiliary dikes are about 200 feet long and 15 feet high, with the same type of foundation as the dam.

Borrow material for the embankment is adequate and in sufficient quantities adjacent to the site. The borrow has been classified as being primarily a sandy silty sand (SM) (23).

Twenty acres of land will be required for minimum landrights Eleven acres, subject to temporary inundation, will be required for the flood pool. Three acres of land will be occupied by the sediment pool, borrow area, dam and spillway. Six acres will be required for the access road and construction parking. Two acres, committed to the sediment pool, will be initially covered with water. This area will gradually decrease as sediment accumulates over the life of the project. The flood pool area will be subject to short term temporary flooding and will experience normal vegetation successional trends over the life of the project. The access road and temporary construction area will be used intensively over the installation period, and all disturbed areas will then be seeded to desirable grasses and legumes. Public access to these areas will be discouraged by fencing of site. For inventories of present land use see Figure 3 (page 12), and for future land use and land use changes see Figure 5 (page 38). For list of resources lost see page 37.

About 380 feet of existing intermittent stream will be permanently destroyed due to construction of the floodwater retarding structure. An additional 1,770 feet of stream will be subject to temporary inundation by floodwater. (See Figure 3, page 12, Potential Impoundment - Wildlife Habitat.)

Each contract will require contractors to adhere to strict guidelines for minimizing soil erosion, water, noise,and air pollution during construction. Borrow areas will be stripped only as they are ready for use. Measures, such as temporary diversions,sediment basins, temporary vegetation and mulching will be used to protect exposed areas until permanent vegetation is established. Adherence to state and local health requirements will be required regarding disease vector control, noise, and air pollution. Suppressors will be used to keep dust within tolerable limits on haul roads. Pollution of surface areas or ground water by chemicals, fuel, lubricants, sewage, and other pollutants, will not be permitted. Clearing and disposal of brush and vegetation will be carried out in accordance with applicable state and local laws.

Requirements for safety and health in conformance with the Federal Construction Safety Act of 1969 (P.L. 91-54) will be included in each construction contract. Design and construction will comply with applicable state laws.

The watershed work plan has been coordinated with the Office of Parks and Recreation and New York State Division of Historic Preservation. Investigations indicate that installation of the project will not encroach on any known archeological values, any historic place, or any places planned for historic preservation. If artifacts or other items of archeological or historical significance are uncovered by SCS, or brought to its attention by others during construction, the Office of Parks and Recreation and the National Park Service will be notified. Appropriate arrangements will be made for survey or salvage as needed.

NONSTRUCTURAL MEASURES

Fourteen acres, consisting of 11 acres open land, and three acres residential development, will still remain subject to flooding by the 100-year frequency event. This remaining flood damage will mainly involve basements, garages, and yards. The city of Oneida will publicize at least once annually the nature and extent of remaining flood hazards and will establish regulations to prevent, to the extent possible, development (both reconstruction and new) in the area subject to flooding by the 100-year event. Properties subject to flooding with project are shown on Table F, Page 36. Urban flooding, with and without project, is shown on the Urban Flood Plain Map, Appendix A.

EXPLANATION OF INSTALLATION COSTS

The total installation cost of the works of improvement is estimated to be $284,450. Of this total, $244,400 will be paid by Public Law 566 funds and $40,050 by other funds. Total installation costs include $42,950 for establishing land treatment measures on private land and $241,500 for structural measures (Table 1).

Land treatment costs include P.L 566 funds of $15,900, to be used by SCS to provide accelerated technical assistance; regular SCS program funds of $2,900, and current cooperative federal-state forestry program funds of $6,100 for technical assistance to continue the going program; and costs of $18,050 for applying land treatment. Landowners and operators will apply land treatment with cost-sharing assistance that may be available through local, state, or federal programs at the time of installation.

SCHEDULE OF OBLIGATIONS - LAND TREATMENT

(Dollars) 1/

Year	Public Law 566 Funds	Other Funds	Total
1	5,400	9,400	14,500
2	5,200	9,050	14,000
3	5,300	8,600	14,450
TOTAL	15,900	27,050	42,950

1/ Price Base 1974

The total installation cost of structural measures includes costs for construction, engineering services, landrights, and project administration. The cost for each major structural measure has been determined individually as shown in Table 2.

Construction costs include the estimated contract costs plus a contingency allowance of 12 percent. All costs are based on estimated quantities and current unit prices. The unit costs were obtained from actual bid prices for similar works constructed in the state and from costs submitted by material supply firms. Construction costs include such items as clearing, excavation, earthfill (including borrow areas), concrete pipe, concrete, fencing, and seeding of disturbed areas. Public Law 566 funds will bear all the construction costs for the single-purpose floodwater retarding structure. This cost is estimated to be $175,800.

Engineering services costs include the direct cost of engineers and other technicians for surveys, engineering and geologic investigations, design, and preparation of plans and specifications for structural measures including the vegetative work associated therewith. The costs for engineering services are estimated at $28,100 and will be borne by P.L. 566 funds.

Relocation payments include moving and related expenses for a displaced person, business, or farm operation, as well as, financial assistance for replacement housing for a displaced person who qualifies and whose dwelling is acquired because of the project. No relocations are anticipated; however, in the event they should occur, the cost-sharing of relocation payments will be based on the ratio of P.L. 566 funds and other funds, minus relocation payments, to the total project cost.

Project administration costs include the costs incurred for layout, inspection, relocation assistance advisory services (when relocation occurs), administration of contracts, and other administrative and clerical services necessary to install the project. The Sponsoring Local Organization will bear the cost it incurs to administer construction contracts and for such inspection and other administrative services as it requires for installation of the project. The Service will bear the cost it incurs for layout, inspection, and for such other administrative, clerical, and other services it provides. The Service may not use P.L. 566 funds to assist the Sponsors to provide relocation assistance advisory services, should these services become necessary. Project administration costs are estimated to be $28,100, including $12,600 for administration of contracts. The Service and the Sponsors will each bear the costs of project administration it provides, estimated to be $24,600 and $3,500 respectively.

The city of Oneida will bear all costs, estimated to be $9,500, for landrights associated with the installation of site No. 1. The cost of landrights includes all costs incurred in acquiring land, easements, and rights-of-way, and all legal costs, including appraisals, associated with the purchase of landrights.

SCHEDULE OF OBLIGATIONS - STRUCTURAL MEASURES

(Dollars) 1/

Fiscal Year	Measures	Public Law 566 Funds	Other Funds	Total
First	Engineering Services	10,000	0	10,000
	Project Administration	4,000	1,000	5,000
	Landrights	0	9,500	9,500
First Year Totals		14,000	10,500	24,500
Second	Engineering Services	10,000	0	10,000
	Project Administration	20,000	1,250	21,250
	Construction	170,800	0	170,800
Second Year Totals		200,800	1,250	202,050
Third	Engineering Services	8,100	0	8,100
	Project Administration	600	1,250	1,850
	Construction	5,000	0	5,000
Third Year Totals		13,700	1,250	14,950
GRAND TOTAL		228,500	13,000	241,500

1/ Price Base 1974

EFFECTS OF WORKS OF IMPROVEMENT

FLOOD PREVENTION, EROSION AND SEDIMENT

Floodwater damages will be reduced about 80 percent by installation of the combined program of land treatment and structural measures. Damages to 18 residences, 2 school yards, 5 blocks of village streets, 4 bridges, and public utilities will be reduced. Eighteen families or about 70 people will benefit directly from urban flood damage reduction. Indirect damages resulting from loss of labor income and rerouted traffic will be reduced by 80 percent.

The discharge, area inundated, and stage in the flood plain will be reduced as a result of the project measures as follows:

Frequency		Without Project			With Project		
Year	% Chance	Discharge (cfs)	1/ Elevation (msl)	Area Flooded (Acres)	Discharge (cfs)	1/ Elevation (msl)	Area Flooded (Acres)
2	50	144	442.8	2	46	441.5	0
5	20	340	443.5	19	118	442.7	0
10	10	490	443.9	26	175	443.0	7
25	4	679	444.2	31	248	443.2	12
100	1	821	444.5	36 2/	304	443.4	17 2/

1/ Elevations reference to cross section on Seneca Street. Bankfull elevation at Seneca Street is 442.7 msl.

2/ See Urban Flood Plain Map in Appendix A.

The 14 acres of remaining flood hazard area include 11 acres of open land wildlife habitat and 3 acres of residential development. The remaining flood hazard to individual residences is shown in Table F. The actual dollar damage to the listed structures can be significantly reduced by individual action. The removal of damageable values from the basements and garage floors along with structural alterations to the doors and windows may be sufficient (22).

TABLE F - REMAINING URBAN FLOOD HAZARD

Frequency	Location	Reference Point	Remaining Flood Stage (ft.)
2-year	310 Searls Avenue	Basement door	0.3
	314 Searls Avenue	Basement door	1.0
5-year	310 Searls Avenue	Basement door	1.6
	314 Searls Avenue	Basement door	2.3
	518 Seneca Street	Garage floor	1.2
25-year	310 Searls Avenue	Basement door	2.0
	314 Searls Avenue	Basement door	2.7
	518 Seneca Street	Garage floor	1.4
	515 Seneca Street	Sun porch	0.1
100-year	310 Searls Avenue	Basement door	2.2
	314 Searls Avenue	Basement door	2.9
	511 Seneca Street	Basement window	0.2
	518 Seneca Street	Garage floor	1.6
	515 Seneca Street	Sun porch	0.3
	522 Seneca Street	Garage floor	0.1
	477 Franklin Street	Basement window	0.2
	308 Belmont Avenue	Basement window	0.2
	475 Sylvan Street	Basement window	0.2
	478 Sylvan Street	Basement door	0.2

No significant land use changes in the benefited area are anticipated because of the city's plan to establish flood plain development regulations. See pages 26 and 31 for details.

Flood damages caused from the recurrence of a storm such as the one in June 1958 will be reduced by about 69 percent under project conditions. Three homes would still be subject to basement damages and inundation of several yards and streets would occur.

Erosion rates on cropped Lairdsville soil will be reduced from 3.2 to less than 2 tons per acre. Erosion on the critical source areas and urban construction will be reduced about 50 percent. Sediment yields to the flood plain and Oneida Creek will be reduced by 77 percent, by the combination of land treatment and structural

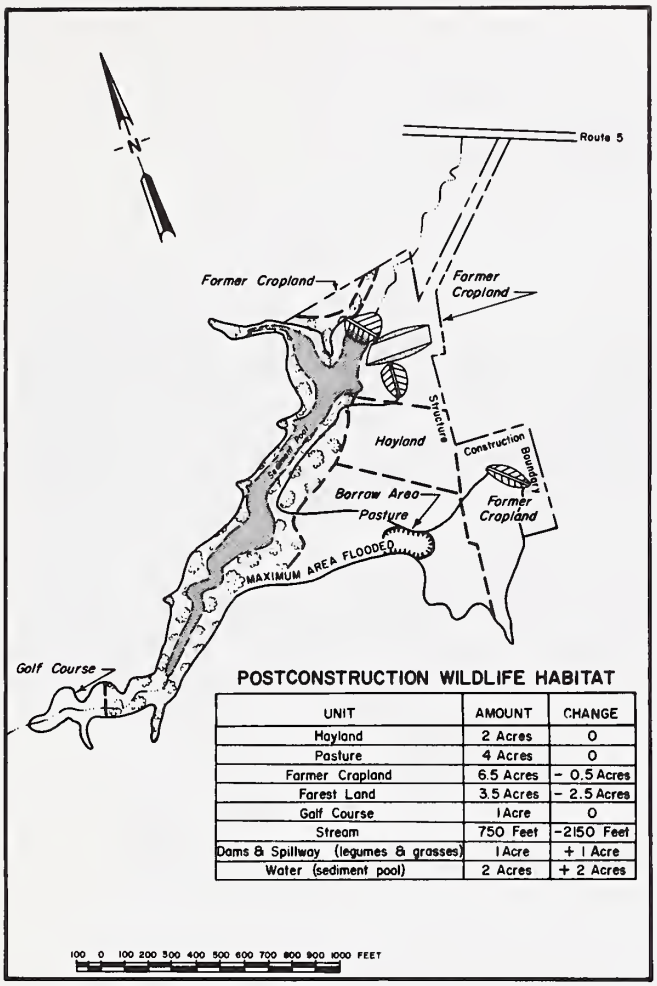
measures. Silt concentration will be reduced to 39 mg/1, based on reduced sediment yields. The cost of sediment removed from the channel is estimated to be reduced 81 percent.

During the period of construction of structure No. 1, some short term erosion increases will occur at about the rate of 24 tons/ acre/year. Sediment yields to the downstream reaches will be minimized by sediment basins and temporary seedings. However, temporary increases in turbidity and sedimentation will occur. A short term increase in air pollution and noise levels will occur, during the installation of the works of improvement.

Van Kirk (26) reports, that when floodwaters are impounded behind a dam the stream below the dam cuts the stream channel wider and slightly deeper. This condition was reported to result in greater meandering of the stream. The channel will be protected for about 100 feet below the dam with vegetation and rock riprap to alleviate this condition.

The constructed lake will undergo evolutionary changes from the time of its creation. A very slow increase in growth of algae and other aquatic plants, over a long period of time, is a natural change. This increase is called eutrophication and is a type of natural succession, as described in *Inland Lakes* published by The Cooperative Extension Service, Michigan State University. Pollution of the lake due to increased levels of nutrients, carried by sediment and floodwater, speed up the process. Pollution will be minimized, however, through the continued application of the land treatment program.

Resources lost, due to construction of the structure, include 2.5 acres of forest and 0.5 acre of open land formerly cropped; however, one acre of dam and spillway will be reseeded to grassy vegetation. Eleven acres in the flood pool, consisting of 3.5 acres of forest, 4.5 acres of open land formerly cropped, 2 acres of pasture, and one acre of the golf course, will remain in low intensity use because of periodic inundation. A temporary loss of 4 acres pasture and 2 acres open land formerly cropped, will occur due to activity during construction. This land will be restored to its present use after construction.



POSTCONSTRUCTION WILDLIFE HABITAT

UNIT	AMOUNT	CHANGE
Hayland	2 Acres	0
Pasture	4 Acres	0
Farmer Cropland	6.5 Acres	- 0.5 Acres
Forest Land	3.5 Acres	- 2.5 Acres
Golf Course	1 Acre	0
Stream	750 Feet	-2150 Feet
Dams & Spillway (legumes & grasses)	1 Acre	+ 1 Acre
Water (sediment pool)	2 Acres	+ 2 Acres

Installation of the floodwater retarding structure will destroy about 380 lineal feet and cause the periodic inundation of about 1,770 lineal feet of intermittent stream channel. About 2.5 acres of forest habitat will be destroyed; 0.5 acre of open land wildlife habitat and 2.0 acres of open water (until sediment pool is filled with sediment) will be created. The 3.5 acres of forest land and 7.5 acres of agricultural land wildlife habitat in the flood pool will be subject to periodic inundation. (See Figure 5.)

Although 11 of 17 acres of open wildlife habitat area within the urban area will remain subject to inundation from a 100-year freqeuncy flood event, reduced flood frequencies and stages will lessen destruction of nestlings and damage to wildlife food.

FIGURE 5 - POSTCONSTRUCTION WILDLIFE HABITAT MAP

The planting of 100 acres of trees will create additional forest wildlife habitat with a concurrent loss of agricultural wildlife habitat. This land treatment activity will speed successional trends on open land formerly cropped.

ECONOMIC AND SOCIAL

Project measures will produce secondary economic effects. Construction activities will create about 8 man-years of employment and maintenance will create about 0.1 man-year of annual employment. The economic base of the region will not be significantly affected.

PROJECT BENEFITS

Average annual flood damages will be reduced from $25,100 to $4,850. Urban floodwater damages will be reduced from about $20,100 to $3,900. Sediment damages will be reduced from $800 to $150, and indirect flood damages will be reduced from $4,200 to $800. The damage reduction benefits of $20,250 include land treatment benefits of $280 and structural measure benefits of $19,970 (Table 5).

Total benefits of $21,670, including flood damage reduction benefits of $19,970 and secondary benefits of $1,700, are anticipated. Average annual cost of the project is estimated at $17,600 (Table 6). Secondary benefits from a national viewpoint were not considered pertinent to the economic evaluation.

COMPARISON OF BENEFITS AND COSTS

The average annual cost of the structural measure is estimated to be $17,600. This measure is expected to produce average annual benefits, excluding secondary benefits, of $19,970 or $1.14 for each dollar of cost.

The ratio of the total average annual project benefits ($21,670) to the average annual cost of structural measures ($17,600) is 1.2 to 1.0.

Table 6 shows a summary of benefits, costs, and the benefit cost ratio.

PROJECT INSTALLATION

The city of Oneida will petition the Madison County Board of Supervisors to establish a small watershed protection district in accordance with New York State's enabling legislation (Article 5-D of the County Law). Upon approval by the County Board of Supervisors, the Higinbotham Brook Small Watershed Protection District will have legal authority and will:

1. Provide the necessary land, easements and rights-of-way for all structural measures. They may obtain landrights through condemnation, if necessary. Appraisals will be obtained as a prerequisite to securing landrights in accordance with provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Public Law 91-646, 84 Stat. 1894).

2. Administer the contracts for all structural measures. The sponsors, at a later date, may request the Soil Conservation Service to administer contracts.

3. Provide for such construction inspection as deemed necessary to protect their interest.

4. Request the assistance of the Cooperative Extension Service, through their agents and specialists, in developing and carrying out the watershed information and education program.

5. Request the cooperation of lending agencies such as local banks, the Farmers Home Administration, the Production Credit Association, and the Federal Land Bank, to provide loans to help cooperating landowners and operators install needed treatment measures.

The Madison County Soil and Water Conservation District will be responsible for providing assistance to landowners and operators to help them plan, establish, and maintain land treatment measures.

The land treatment measures will be installed at an approximate uniform rate over the 3-year installation period of the project. Similar measures required to meet the total conservation needs will continue to be installed thereafter.

The Soil Conservation Service will:

1. Under the Madison County Soil and Water Conservation District's Memorandum of Understanding with the U. S. Department of Agriculture, provide technical assistance for planning, installing, and maintaining conservation measures.

2. Furnish engineering services for the surveys, layouts, design, and preparation of plans and specifications for the structural measure.

3. Provide for project administration services, including a government representative administering the expenditure of federal funds, and ensuring that all structural measures are installed in accordance with plans and specifications.

The Forest Service will:

Provide guidance and direction to the New York State Department of Environmental Conservation, Division of Lands and Forests for implementation of the proposed forestry treatment.

The New York State Department of Environmental Conservation, Division of Lands and Forests will:

In cooperation with the U. S. Forest Service, furnish technical assistance to landowners and others for the determination of needed practices and installation of forest treatment measures.

The city of Oneida will:

1. Publish at least once annually the nature and extent of remaining flood hazards.

2. Establish regulations, to the extent possible, to prevent development (both reconstruction and new) in the area subject to flooding by the 100-year frequency event.

3. Replace existing culverts with the proper sizes, as replacement needs arise.

FINANCING PROJECT INSTALLATION

Federal assistance, financial and other, to be furnished by the Soil Conservation Service in carrying out the project, is contingent on the appropriation of funds for this purpose. Before federal funds are made available, the Sponsoring Local Organization will:

1. Give assurances that all necessary landrights have been secured.

2. Obtain agreements to carry out recommended soil conservation measures and proper farm plans from owners of not less than 50 percent of the lands situated in the drainage area above the site.

3. Provide for administering the contracts.

4. Execute a project agreement.

Technical assistance funds for forestry activities will be provided through the going program of the U. S. Forest Service and the Forest Practice Act Program of the New York State Department of Environmental Conservation.

The Madison County Agricultural Stabilization and Conservation Committee will provide cost-sharing assistance to farmers in the watershed for installation of land treatment measures in accordance with the provisions of the program in effect at the time assistance is provided.

The Farmers Home Administration will give special consideration to eligible farm families in the way of credit and farm management guidance to establish the necessary land treatment measures and improve farm income. This assistance may vary over the years as the regulations pertaining to Farmers Home Administration loan programs are altered to meet changing conditions.

The Madison County Board of Supervisors will provide for expenses incurred in the formation of the Small Watershed Protection District. The Higinbotham Small Watershed Protection District will bear the landrights costs associated with the installation of the floodwater retarding structure, and the project administration costs that it incurs. Funds for these district establishment expenses and landrights costs, will be provided through procedures prescribed in New York State's enabling legislation (County Law). Under provisions of County Law, up to 50 percent of the costs of landrights needed for flood prevention may be reimbursable through New York State funding.

PROVISIONS FOR OPERATION AND MAINTENANCE

LAND TREATMENT MEASURES

Land treatment measures will be operated and maintained by the landowners and operators. Technical assistance will be provided by the Madison County Soil and Water Conservation District and the New York State Division of Lands and Forests, subject to availability of resources.

STRUCTURAL MEASURES

Annual operation and maintenance cost for the structural measure is estimated to be $900. This cost will be borne by the city of Oneida through regular appropriations. Operation and maintenance to be performed by the city, involves mowing the dams, cleaning the trash racks, eliminating floating debris, repairing fences, repair of any damage to the dam or spillways, and periodic replacement of deteriorated parts of the structure.

The Sponsors and the Soil Conservation Service will make a joint inspection annually, after unusually severe floods, and after the occurrence of any other unusual conditions that might adversely affect the structural measures. They will jointly determine what maintenance measures are needed. These inspections will continue for 3 years following installation of the structure. Inspection after the third year will be made annually by the Sponsors. They will prepare a report and send a copy to the Service.

An establishment period of 3 years is provided for all structural works of improvement and associated vegetative cover. During this period, the Soil Conservation Service may use P.L. 566 funds to cost-share on any repairs or other work resulting from unknown conditions or construction deficiencies. The cost of repairs will be shared in the same ratio as cost of original structure.

Repairs or additional work not eligible for P.L. 566 financial assistance include maintenance work, and work resulting from improper operation and maintenance. However, the Soil Conservation Service will provide technical assistance that may be needed in performing any of these tasks.

An operation and maintenance agreement for the structure between the Soil Conservation Service and the city of Oneida will be executed prior to the signing of a project agreement. An operation and maintenance plan will be prepared for the structure in accordance with guidelines outlined in the *State of New York Watersheds Operation and Maintenance Handbook*, published by the Soil Conservation Service.

TABLE 1 - ESTIMATED PROJECT INSTALLATION COST

Higinbotham Brook Watershed, New York

Installation Cost Item	Unit	Number	Estimated Cost (Dollars) 1/						
			P. L. 566 Funds			Other Funds			
			S.C.S. 3/	F.S. 3/	TOTAL	S.C.S. 3/	F.S. 3/	Total	TOTAL
LAND TREATMENT									
Land Areas 2/									
Cropland	Acres	50				3,650		3,650	3,650
Pastureland	Acres	36				1,860		1,860	1,860
Forest land	Acres	180					7,200	7,200	7,200
Urban and Built-up	Acres	80				3,000	500	3,500	3,500
Other land	Acres	28				1,840		1,840	1,840
Technical Assistance			15,900		15,900	2,900	6,100	9,000	24,900
TOTAL LAND TREATMENT			15,900		15,900	13,250	13,800	27,050	42,950
STRUCTURAL MEASURES									
Construction									
Floodwater Retarding Structure	No.	1	175,800		175,800				175,800
Subtotal - Construction			175,800		175,800				175,800
Engineering Services			28,100		28,100				28,100
Relocation Payments			0		0				0
Project Administration									
Construction Inspection			12,000		12,000	500		500	12,500
Other			12,600		12,600	3,000		3,000	15,600
Relocation Assistance Advisory Services			0		0	0		0	0
Subtotal - Administration			24,600		24,600	3,500		3,500	28,100
Other Costs									
Land Rights						9,500		9,500	9,500
Subtotal - Other						9,500		9,500	9,500
TOTAL STRUCTURAL MEASURES			228,500		228,500	13,000		13,000	241,500
TOTAL PROJECT			244,400		244,400	26,250	13,800	40,050	284,450

1/ Price Base 1974.
2/ Includes only areas estimated to be adequately treated during the project installation period. Treatment will be accelerated throughout the watershed, and dollar amounts apply to total land areas, not just to adequately treated areas.
3/ Federal agency responsible for assisting in installation of works of improvement.

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TABLE 1A - STATUS OF WATERSHED WORKS OF IMPROVEMENT

Higinbotham Brook Watershed, New York

Measures	Unit	Applied to Date	Total Cost (Dollars) 1/
LAND TREATMENT			
328 Conservation Cropping System	Acre	114	- 2/
330 Contour Farming	Acre	80	160
362 Diversion	Feet	2,500	625
382 Fencing	Feet	8,000	20,000
472 Livestock Exclusion	Acre	85	-
480 Drainage Main or Lateral	Feet	1,700	850
510 Pasture and Hayland Management	Acre	70	1,050
512 Pasture and Hayland Planting	Acre	96	7,200
556 Planned Grazing Systems	Acre	70	-
585 Stripcropping	Acre	80	960
606 Drains	Feet	800	520
612 Tree Planting	Acre	6	300
TOTAL			31,665

1/ Price Base: 1974
2/ All measures having a dash (-) under Total Cost column indicates no cost of installation by the landowner.

March 1974

TABLE 2 - ESTIMATED STRUCTURAL COST DISTRIBUTION

Higinbotham Brook Watershed, New York
1/
(Dollars)

Item	Installation Cost P.L. 566 Funds			Installation Cost - Other Funds		Total Installation Cost
	Construction	Engineering	Total P.L. 566	Land 2/ Rights	Total Other	
Floodwater Retarding Structure	175,800	28,100	203,900	9,500	9,500	213,400
Project Administration	:::::	:::::	24,600	::::	3,500	28,100
GRAND TOTAL	175,800	28,100	228,500	9,500	13,000	241,500

1/ Price base 1974.
2/ Includes $1,500 for survey, legal fees, and other costs.

March 1974

TABLE 3 - STRUCTURAL DATA

STRUCTURE WITH PLANNED STORAGE CAPACITY

Higinbotham Brook Watershed, New York

ITEM	UNIT	FLOODWATER RETARDING STRUCTURE
Class of Structure		c
Drainage Area	Sq. Mi.	0.80
Curve No. (1-day) (AMC II)		77
Tc	Hrs.	1.0
Elevation Top of Dam	Ft.	540.9
Elevation Crest Emergency Spillway	Ft.	534.1
Elevation Crest High Stage Inlet	Ft.	528.0
Elevation Crest Low Stage Inlet	Ft.	513.1
Maximum Height of Dam	Ft.	52.8
Volume of Fill	Cu. Yds.	51,000
Total Capacity 1/	Ac. Ft.	169
Sediment Submerged 100 years	Ac. Ft.	22
Sediment Aerated	Ac. Ft.	4
Retarding	Ac. Ft.	143
Between high and low stage	Ac. Ft.	75
Surface Area		
Sediment pool	Acres	2
Retarding pool	Acres	13
Principal Spillway		
Runoff Volume (areal) (1 Day)	In.	3.5
Runoff Volume (10 day)	In.	8.8
Capacity of Low Stage (Max.)	cfs.	18
Capacity of High Stage (Max.)	cfs.	200
Frequency operation - Emer. Spill.	% chance	1
Size of Conduit	Diam. In.	30
Emergency Spillway		
Rainfall Volume (ESH) (areal)	In.	8.75
Runoff Volume (ESH)	In.	4.8
Type		Veg. Earth
Bottom Width	Ft.	75
Velocity of flow (Ve)	Ft./Sec.	5.0
Slope of exit channel	Ft./Ft.	.036
Maximum water surface elevation	Ft.	535.3
Freeboard		
Rainfall Volume (FH) (areal)	In.	22.0
Runoff volume (FH)	In.	17.2
Maximum water surface elevation	Ft.	540.9
Capacity Equivalents		
Sediment Volume	In.	0.6
Retarding Volume	In.	3.35

1/ Crest of Emergency Spillway

March 1974

TABLE 4 - ANNUAL COST

Higinbotham Brook Watershed, New York

(Dollars) [1/]

Evaluation Unit	Amortization of Installation Cost [2/]	Operation and Maintenance Cost	Total
Structure	14,700	900	15,600
Project Administration	2,000	::: :::	2,000
GRAND TOTAL	16,700	900	17,600

1/ Price base: 1974 prices
2/ 100 years at 6 7/8 percent interest

March 1974

TABLE 5 - ESTIMATED AVERAGE ANNUAL FLOOD DAMAGE REDUCTION BENEFITS

Higinbotham Brook Watershed, New York

(Dollars) 1/

Item	Estimated Average Annual Damage		Damage Reduction Benefit
	Without Project	With Project	
Floodwater Nonagricultural	20,100	3,900	16,200
Sediment	800	150	650
Indirect	4,200	800	3,400
TOTAL	25,100	4,850	20,250

1/ Price base: Future projected

March 1974

TABLE 6 - COMPARISON OF BENEFITS AND COSTS FOR STRUCTURAL MEASURE

Higinbotham Brook Watershed, New York

(Dollars)

Evaluation Unit	AVERAGE ANNUAL BENEFITS 1/ Damage Reduction	Secondary Benefits	Total	Average 3/ Annual Cost	Benefit Cost Ratio
Structural Measures	19,970	1,700	21,670	15,600	1.4:1.0
Project Administration	::::: :::::	::::: :::::	:::::: ::::::	2,000	::::::: :::::::
GRAND TOTAL	19,970 2/	1,700	21,670	17,600	1.2:1.0

1/ Price base: Future projected

2/ In addition, it is estimated that land treatment measures will provide flood damage reduction benefits of $280 annually.

3/ From Table 4

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INVESTIGATIONS AND ANALYSES

LAND TREATMENT

Present and future land use and land treatment needs were determined by Soil Conservation Service technicians assisting the Madison County Soil and Water Conservation District, representatives of the New York State Division of Lands and Forests, and the United States Forest Service.

Basic data used in developing the land treatment program included records of land treatment practices already applied by landowners in the watershed, land use trends, soil survey data, and information contained in the Conservation Needs Inventory. Technical assistance time requirements were based on records of time required to establish these practices in the past. Cost of establishing these practices was based on records maintained by the Madison County Agricultural Stabilization and Conservation Service, the Soil and Water Conservation District, and the New York State Department of Environmental Conservation, Division of Lands and Forests.

Information on the hydrologic condition of the forest land in the watershed, and the reasons for the present hydrologic conditions, were obtained in a series of systematically located sample field plots. Information gathered on the plots included measurements of the incorporated soil organic matter, compaction of the forest floor, humus types, and the hydrologic soil grouping. From these data, runoff curve numbers were obtained for the forest land. Disturbances, such as fire, cutting, logging, grazing, insect, and disease damage, were evaluated and existing forest management conditions were observed on each plot.

Site characteristics, such as soil texture, soil depth, and slope, were measured and the physical ability of the site to improve hydrologically was determined. From this information, forest management practices, which would maintain or improve forest resources and hydrologic conditions, were determined for the watershed.

Established watershed and statewide forest fire control goals have been met. The present degree of protection afforded by local agencies is adequate to meet any increased hazard and risk resulting from the project's installation and expected future urban development.

FISH AND WILDLIFE

A joint interagency field reconnaissance was conducted to evaluate the fish and wildlife aspects of the watershed. Participating was a biologist from each of the following agencies: the New York State Department of Environmental Conservation, Division of Fish and Wildlife; U. S. Fish and Wildlife Service, Bureau of Sport Fisheries and Wildlife; and the Soil Conservation Service. Stream survey data of the Division of Fish and Wildlife was used.

HYDROLOGIC AND HYDRAULIC INVESTIGATIONS

Hydrologic conditions of the watershed were determined by considering such factors as climate, geology, topography, soils, land use, and vegetative cover. Soil-cover complex data were assembled for present and future conditions. From this, a runoff curve number was assigned to indicate the runoff potential for each area.

Nine valley sections and two channel sections were surveyed to represent average stream hydraulics and to define flood damage areas. Preliminary locations for channel and valley sections were made by examination of aerial photographs and USGS 7 1/2 minute quadrangle sheets. Final locations were selected after a reconnaissance of the watershed.

Rating curves were determined from field survey data by computing water surface profiles for various discharges. Stage-discharge relations for each section were determined using Manning's Equation, and the modified Leach method for water surface profiles.

The synthetic frequency method of analysis was used to evaluate this project. Rainfall data were obtained from the United States Weather Bureau Technical Paper No. 40. Runoff from the 100-, 25-, 10-, 5-, and 2-year frequency rainfall events were flood routed to establish frequency-discharge relationships for the evaluation reach. Flood routings were performed by the IBM 1130 computer using the procedures outlined in SCS Technical Release No. 20.

Flood routing was completed for present conditions and with the floodwater retarding structure in place to modify the frequency-discharge curves. The selected structure release rate was based on available reservoir storage and downstream channel capacities.

ENGINEERING

For this study, the sources of information included the following:

1. U. S. Geological Survey maps 7 1/2 minute with 10-foot contour intervals.

2. Aerial photo coverage at a scale of 1:7,920.

3. Field surveys tied to USGS datum for various structure sites and channel sections. The field surveys consisted of topographic surveys of the structure sites.

4. Ownership map with property lines supplied by the sponsors.

5. A geologic investigation was made at site No. 1.

Structure site No. 1 and a debris basin site were studied for single and multiple-purpose developments. Standard Service criteria and procedures were followed in the development of designs. Cost estimates were based on recent New York Public Law 566 contract unit prices for such items as concrete, earthfill, common and rock excavation, rock riprap, and clearing and grubbing.

Reservoir routings, earthfill calculations and other calculations were accomplished by using the computer services of the Automatic Data Processing Unit (ADP) in Upper Darby, Pennsylvania and computer programs developed by the Service for this purpose.

The hydraulic and hydrologic design, of the floodwater retarding structure is considered to be in final form. A landrights work map has been transmitted to the Sponsors. This structure was considered to be a class "c" (high potential hazard) for design purposes. This structure has a vegetated emergency spillway and a reinforced concrete drop inlet principal spillway.

ECONOMICS

Floodwater damage reduction benefits were computed using the frequency method described in the SCS Economics Guide. Key flood damage (urban and sediment) data were obtained from interviews in 1958 of occupants of the flood hazard area. A damage curve was developed by identifying beginning damages, stage-damages from "Key Flood", and extrapolated damages expected from 100-year flood. Damages were evaluated for future conditions "without project" and future conditions "with project". The difference between these conditions was considered reduced damages and was used as project benefits.

A one percent reduction of estimated flood damages was used to assign benefits to land treatment in this project. Indirect damages such as interruption of employment and closing of roads were estimated to be 20 percent of direct damages. All flood prevention benefits were based on current prices adjusted to future values for the Syracuse-Utica Economic Area using 100-year term at 6 7/8 percent. Secondary benefits stemming from the project were estimated to be 10 percent of the direct primary benefits.

Cost estimates were based on 1974 prices and converted to average annual costs by using 6 7/8 percent interest and a 100-year life. Operation and maintenance costs were converted to future adjusted prices. Land-rights costs were estimated by a committee representing the Sponsors.

GEOLOGY

A detailed investigation of the floodwater retarding structure site was carried out in November 1959. Test pits were dug with a backhoe. Representative disturbed bag samples were taken and their locations recorded. Sieve analysis, hydrometer analysis and Atterberg limit tests were made by following procedures outlined by ASTM.

Sediment storage requirements for the proposed structure were calculated using the Universal Soil Loss Equation and procedures outlined in the Watershed Planning Guide and SCS Technical Release No. 12. Factors considered were land use, soils, cover conditions, topography, sheet and channel erosion, delivery rates and trap efficiency of the reservoir. All of the basic data were obtained from soils maps, aerial photographs, and actual field measurements.

The preliminary earthquake investigation included location of the watershed on the Seismic Risk Map from Algermissen's 1969 Seismic Risk Map of U.S., a review of earthquake records in "Earthquake History of United States", Part I, ESSA, 1965; a study of regional geology maps for evidence of major active faulting or areas of crustal movement, and a study of the geology at proposed structure sites to identify critical materials or geologic conditions that pose as earthquake hazards.

ARCHEOLOGICAL SURVEY

An archeological survey was conducted in February 1974 by a Kirkland College anthropologist and field crew upon recommendation by the New York State Museum and Science Service. A literature review of New York State Museum and Science Service archeological site files, copies of the site files of the Fort Stanwix Museum of Rome, New York, and pertinent archeological and historical literature was conducted. Seventeen test pits (approximately 50 cm in diameter and depths up to 1.1 meters) were excavated on the proposed structural site, to seek evidence of prehistoric human occupation.

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BIBLIOGRAPHY

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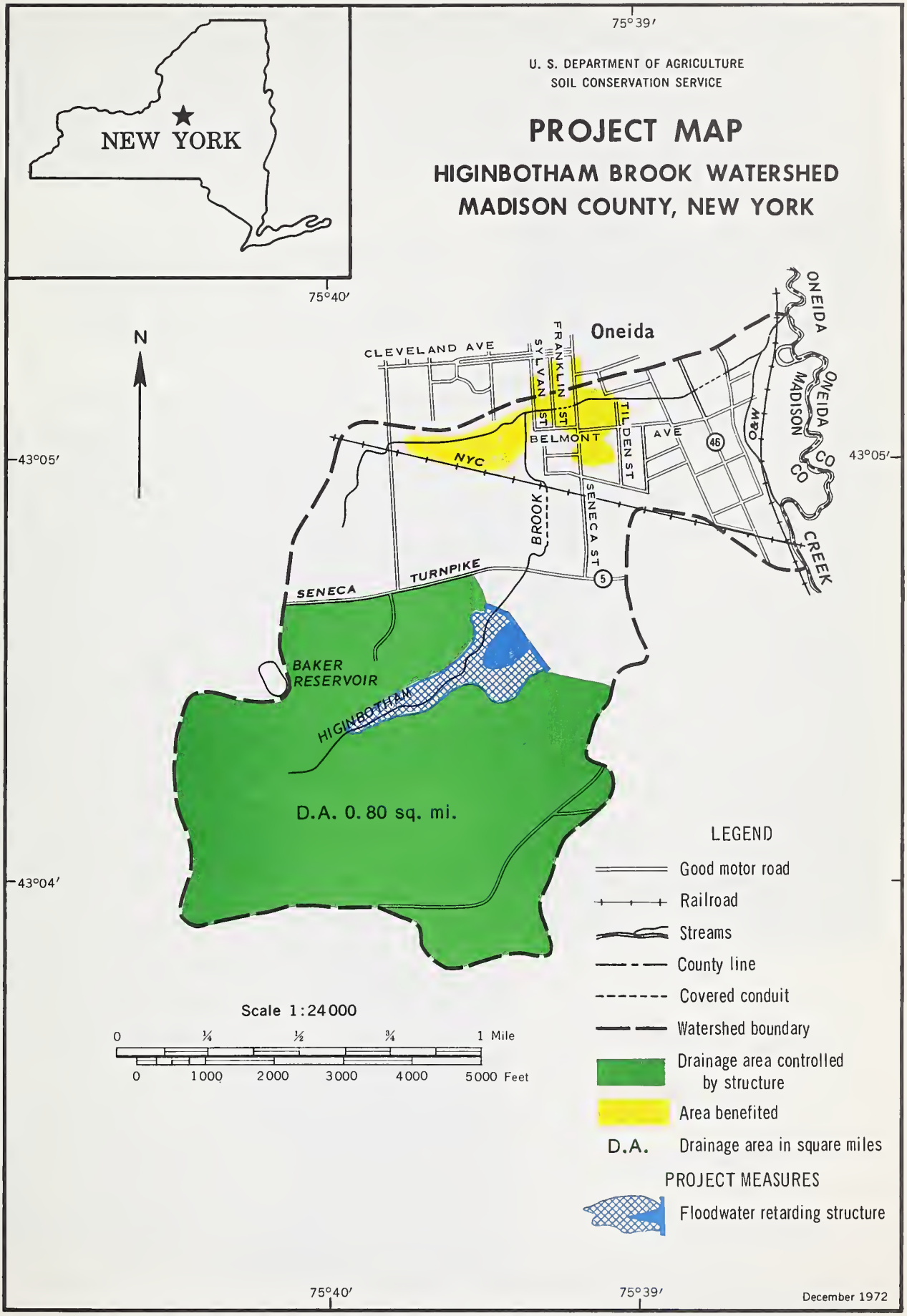
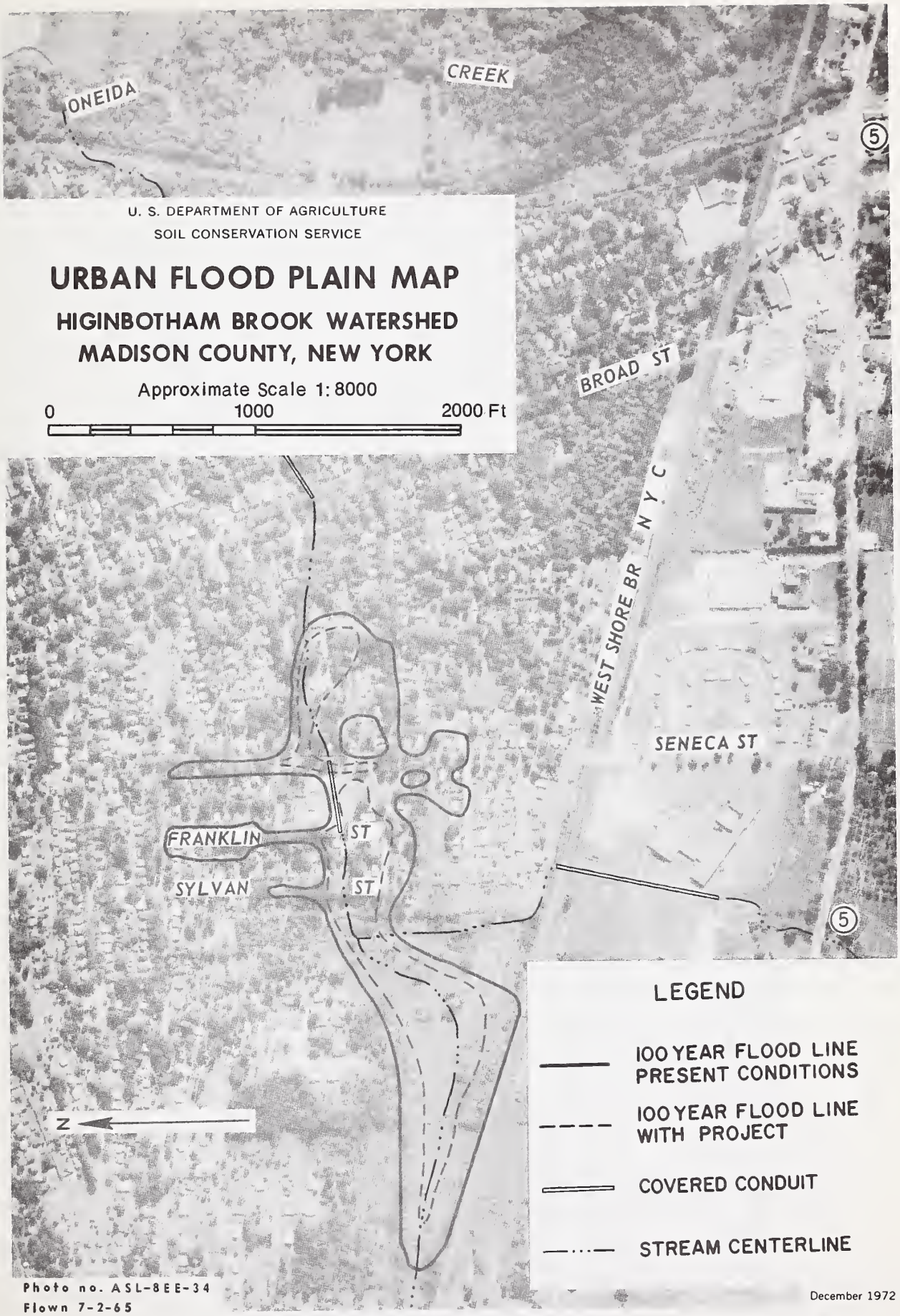
APPENDIX A


75°39′
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
PROJECT MAP
HIGINBOTHAM BROOK WATERSHED
MADISON COUNTY, NEW YORK
NEW YORK
75°40′
N
43°05′
43°04′
Oneida
CLEVELAND AVE
SYLVAN ST
FRANKLIN ST
TILDEN ST
BELMONT
AVE
46
NYC
W&O
ONEIDA
ONEIDA CO
MADISON CO
CREEK
BROOK
SENECA ST
5
SENECA
TURNPIKE
BAKER
RESERVOIR
HIGINBOTHAM
D.A. 0.80 sq. mi.
Scale 1:24000
0 ¼ ½ ¾ 1 Mile
0 1000 2000 3000 4000 5000 Feet
LEGEND
Good motor road
Railroad
Streams
County line
Covered conduit
Watershed boundary
Drainage area controlled by structure
Area benefited
D.A. Drainage area in square miles
PROJECT MEASURES
Floodwater retarding structure
75°40′
75°39′
December 1972
USDA-SCS-HYATTSVILLE, MD. 1973



U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

URBAN FLOOD PLAIN MAP

HIGINBOTHAM BROOK WATERSHED
MADISON COUNTY, NEW YORK

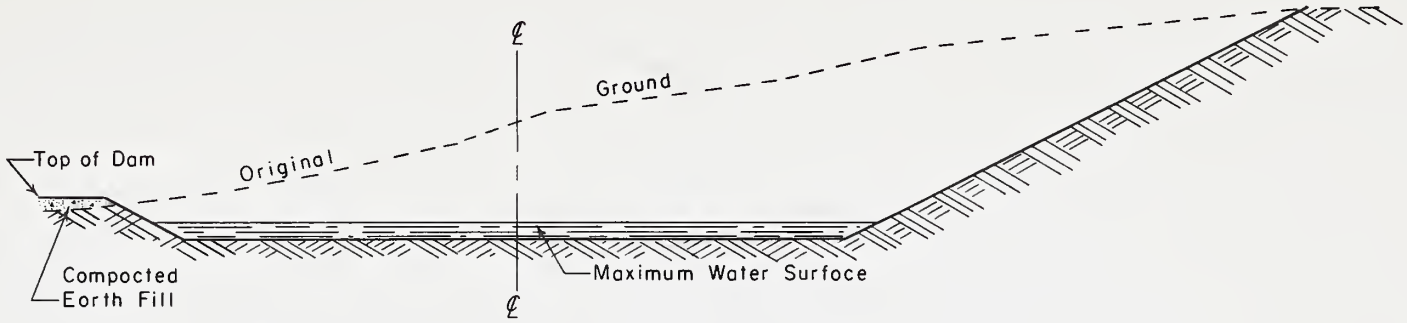
Approximate Scale 1: 8000

0 1000 2000 Ft

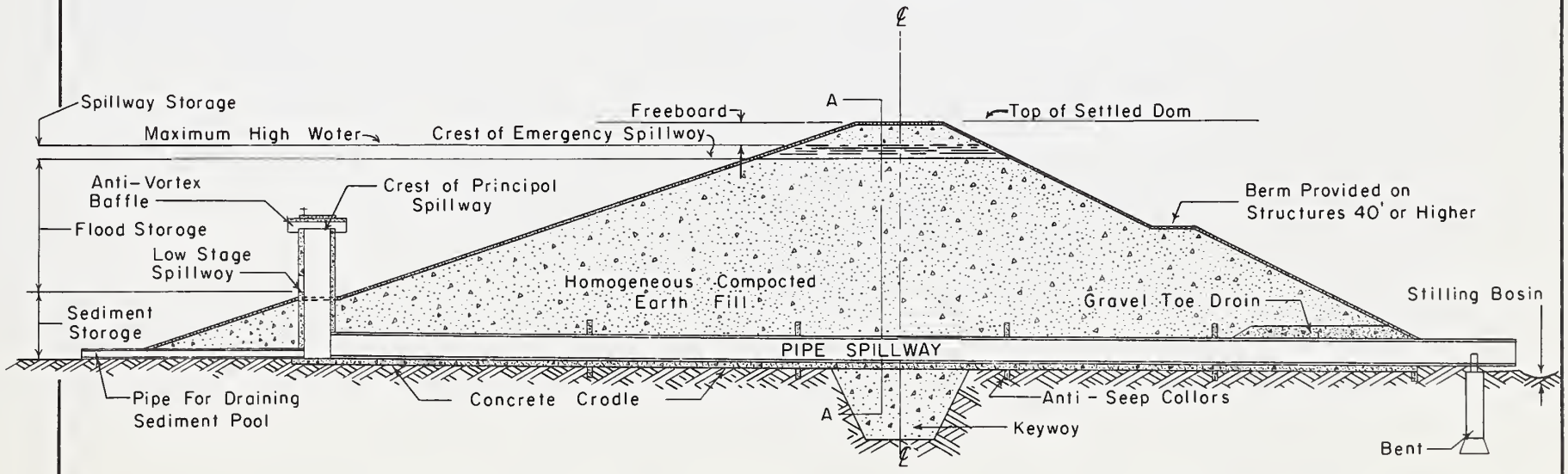
Photo no. ASL-8EE-34
Flown 7-2-65

December 1972

USDA-SCS-HYATTSVILLE, MD. 1973



SECTION A-A
CROSS SECTION OF EMERGENCY SPILLWAY
CONTROL SECTION



TYPICAL CROSS SECTION OF FLOODWATER RETARDING STRUCTURE
ALONG PRINCIPAL AND EMERGENCY SPILLWAYS

APPENDIX B

DEFINITION OF LAND TREATMENT MEASURES

Conservation Cropping System (acres): Growing crops in combination with needed cultural and management measures. Cropping systems include rotations that contain grasses and legumes, as well as rotations in which the desired benefits are achieved without the use of such crops.

Contour Farming (acres): Farming sloping cultivated land in such a way that plowing, preparing land, planting, and cultivating are done on the contour. (This includes following established grades of terraces, diversions, or contour strips).

Critical Area Planting (acres): Planting vegetation such as trees, shrubs, vines, grasses, or legumes on critical areas. (Does not include tree planting mainly for wood products).

Crop Residue Management (acres):

> Crop Residue Use: Using plant residues to protect cultivated fields during critical erosion periods.
>
> Stubble Mulching: Managing plant residues on a year-round basis in which harvesting, tilling, planting, and cultivating operations are performed in such a way to keep protective amounts of vegetation on the soil surface..

Diversion (feet): A channel with a supporting ridge on the lower side constructed across the slope.

Mulching (acres): Applying plant residues or other suitable materials not produced on the site to the soil surface.

Pasture and Hayland Management (acres): Proper treatment and use of pastureland or hayland.

Pasture and Hayland Planting (acres): Establishing and reestablishing long-term stands of adapted species of perennial, biennial, or reseeding forage plants. (Includes Pasture and Hayland Renovation. Does not include Grassed Waterway or Outlet on Cropland).

Stripcropping Field (acres): Growing crops in a systematic arrangement of strips or bands across the general slope (not on the contour) to reduce water erosion. The crops are arranged so that a strip of grass or close-growing crop is alternated with a clean-tilled crop or fallow.

Wildlife Upland Habitat Management (acres): Retaining, creating, or managing wildlife habitat other than wetland.

Tree Planting (acres): Planting tree seedlings or cuttings.

Forest Environmental Improvement (acres): Supervised harvest, timber stand improvement, and hydrologic stand improvement.

Urban Environmental Forestry (acres): Advice that a forester gives about any land going from forest land use to urban land use.

Woodland Grazing Control (acres): Fencing of forest land to control livestock grazing.

SOME SONGBIRDS AND BIRDS OF PREY KNOWN TO NEST IN NEW YORK

Red-tailed Hawk
Red-shouldered Hawk
Marsh Hawk
Sparrow Hawk
Mourning Dove
Black-billed Cuckoo
Screech Owl
Great Horned Owl
Barred Owl
Ruby-throated Hummingbird
Cliff Swallow
Yellow-shafted Flicker
Pileated Woodpecker
Hairy Woodpecker
Downy Woodpecker
Eastern Kingbird
Great Crested Flycatcher
Eastern Phoebe
Traill's Flycatcher
Least Flycatcher
Eastern Wood Pewee
Horned Lark
Tree Swallow
Bank Swallow
Barn Swallow
Blue Jay
Common Crow
Black-capped Chickadee
White-breasted Nuthatch
Long-billed Marsh Wren
Short-billed Marsh Wren
Catbird
Brown Thrasher
Robin
Wood Thrush
Veery
Eastern Bluebird
Starling
Red-eyed Vireo
Warbling Vireo
Prothonotary Warbler
Golden-winged Warbler
Yellow Warbler
Cerulean Warbler
Ovenbird
Northern Waterthrush
Mourning Warbler
Yellowthroat
American Redstart
House Sparrow
Bobolink
Eastern Meadowlark
Red-winged Blackbird
Baltimore Oriole
Common Grackle
Brown-headed Cowbird
Scarlet Tanager
Cardinal
Rose-breasted Grosbeak
Indigo Bunting
Purple Finch
American Goldfinch
Rufous-sided Towhee
Savannah Sparrow
Vesper Sparrow
Chipping Sparrow
Field Sparrow
Swamp Sparrow
Song Sparrow

LISTINGS OF REPTILES AND AMPHIBIANS

Reptiles	Common Name	Scientific Name
A) Snakes		
	Eastern Ring-Necked Snake	Diadophis punctatus edwardsi
	Northern Water Snake	Natrix sipedon sipedon
	DeKay's Snake	Storeria dekayi
	Eastern Ribbon Snake	Thamnophis sauritus sauritus
	Eastern Garter Snake	Thamnophis sirtalis sirtalis
	Eastern Hog-Nosed Snake	Heterodon platyrhinos platyrhinos
	Northern Black Racer	Coluber constrictor constrictor
	Eastern Smooth Green Snake	Opheodrys v. vernalis
	Black Rat Snake	Elaphe obsoleta obsoleta
	Eastern Milk Snake	Lampropeltis doliata triangulum
	Red-Bellied Snake	Storeria occipitomaculata
B) Turtles		
	Stinkpot	Sternotherus odoratus
	Wood Turtle	Clemmys insculpta
	Eastern Box Turtle	Terrapene carolina carolina
	Map Turtle	Graptemys geograp
	Eastern Painted Turtle	Chrysemys picta picta
	Common Snapping Turtle	Chelydra serpentina serpentina
Amphibians		
A) Salamanders		
	Red Eft Newt	Diemictylus viridescens
	Four-Toed Salamander	Hemidaclyium scutatum
	Red-Backed Salamander	Plethodon cinercus
	Slimy Salamander	Plethodon glutinosus
	Spring Salamander	Gyrinophilus porphyriticus
	Two-Lined Salamander	Eurycea bislineata
	Dusky Salamander	Desmognathus fuscus
	Spotted Salamander	Ambystoma maculatum
B) Toads & Frogs		
	Spadefoot	Scaphiopus holbrooki
	American Toad	Bufo terrestris americanus
	Fowlers Toad	Bufo woodhousei fowleri
	Cricket Frog	Acris gryllus
	Swamp Cricket Frog	Pseudacris nigrita triseriata
	Peeper	Hyla crucifer
	Tree Toad	Hyla versicolor
	Mink Frog	Rana septentrionalis
	Wood Frog	Rana sylvatica
	Pickerel Frog	Rana palustris
	Meadow or Lepard Frog	Rana pipiens
	Green Frog	Rana clamitans
	Bullfrog	Rana catesbeiana

SMALL MAMMALS FOUND THROUGHOUT NEW YORK

Least Weasel

Chipmunk

Bonaparte's Weasel

N. Y. Weasel

Norway (House) Rat

Allegheny Wood Rat

Water Shrew

Smoky Shrew

Star-nosed Mole

Hairy-tailed Mole

Common Mole

Least Shrew

Short-tailed Shrew

Common (cinereous) Shrew

Pigmy Shrew

Say's Bat

Big Brown Bat

Pipistrelle

Hoary Bat

Canadian Deer Mouse

Woodland Jump Mouse

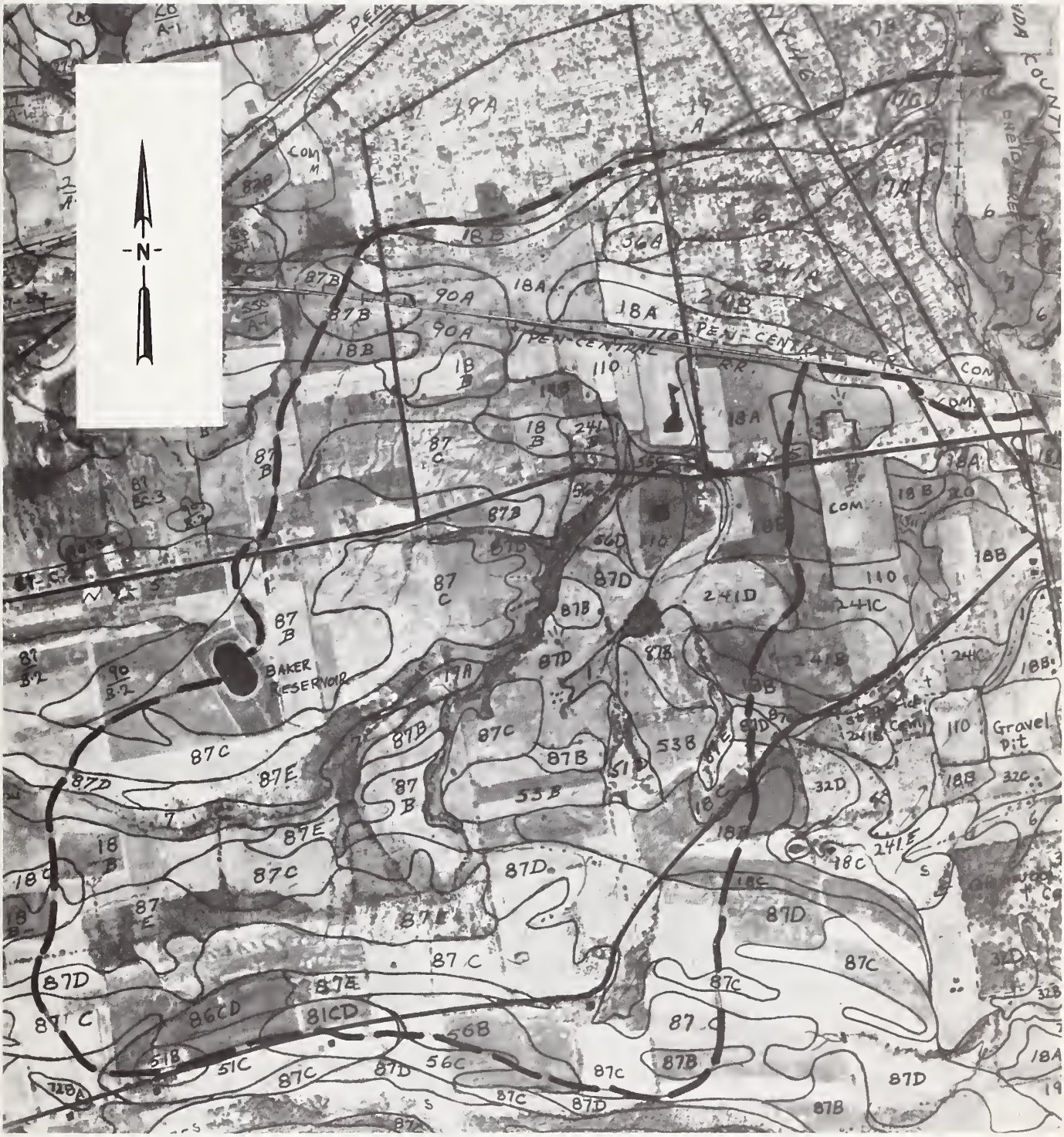
Red Backed Mouse

House Mouse

Field (Meadow) Mouse

Lemming Mouse

Rock (yellow-nosed) Vole



SOIL SURVEY MAP (scale 1:15,840)

TABLE 1 - APPROXIMATE ACREAGE OF THE SOILS

Mapping Unit	Soil	Acres
1	Alluvial land	4
6	Teel silt loam	42
7	Wayland silt loam	18
17A	Palmyra gravelly loam, 0 to 3% slopes	17
17B	Palmyra gravelly loam, undulating	10
17C	Palmyra gravelly loam, rolling	7
18A	Wampsville gravelly silt loam, 0 to 3% slopes	63
18B	Wampsville gravelly silt loam, undulating	90
18C	Wampsville gravelly silt loam, rolling	7
19A	Phelps gravelly silt loam, 0 to 3% slopes	4
19B	Phelps gravelly silt loam, 3 to 8% slopes	7
36A	Odessa silt loam	4
51B	Honeoye silt loam, 3 to 8% slopes	4
51C	Honeoye silt loam, 8 to 15% slopes	5
51D	Honeoye silt loam, 15 to 25% slopes	2
53B	Ontario loam, 3 to 8% slopes	25
56B	Cazenovia silt loam, 3 to 8% slopes	14
56C	Cazenovia silt loam, 8 to 15% slopes	5
56D	Cazenovia silt loam, 15 to 25% slopes	2
81CD	Wassaic silt loam, 8 to 15% slopes	6
86CD	Camillus silt loam, 8 to 15% slopes	9
87B	Lairdsville silt loam, 3 to 8% slopes	146
87C	Lairdsville silty clay loam, 8 to 15% slopes, eroded	199
87D	Lairdsville silty clay, 15 to 25% slopes, eroded	101
87E	Lairdsville silty clay loam, 25 to 40% slopes, eroded	101
90A	Lockport silt loam, 0 to 3% slopes	19
241A	Howard fine sandy loam, 0 to 3% slopes	22
241B	Howard fine sandy loam, undulating	21
241C	Palmyra-Arkport complex, rolling	2
241D	Palmyra-Arkport complex, steep	29
110	Cut and fill land	45
Total		1,030

APPENDIX - SOILS OF THE HIGINBOTHAM BROOK WATERSHED

Alluvial land - This unit consists of a heterogeneous mixture of recently deposited alluvial soils with no one soil dominant. Soil profile development is weak or absent. Drainage and texture vary considerably over short distances. This land type is adjacent to streams in nearly level areas and is subject to annual flooding. (Capability Subclass Vw)

Teel silt loam - This deep, moderately well to somewhat poorly drained, nearly level soil has formed in recent silty alluvium derived from high lime upland glacial drift. It occurs along the lower end of Higinbotham Brook and Oneida Creek. It is subject to flooding during periods of peak runoff, usually in the spring. (Capability Subclass IIw)

Wayland silt loam - This deep, nearly level, medium textured soil has formed in recent silt loam derived from high lime upland glacial drift. This poor to very poorly drained soil occurs adjacent to Higinbotham Brook at the upstream end. It is subject to seasonal flooding and the water table stands at or near the surface for prolonged periods during the year. (Capability Subclass IIIw).

Palmyra gravelly loam, 0 to 3 percent slopes - This deep, nearly level, well drained soil has formed in glacial outwash deposits of sand and gravel. The surface and subsoil horizons are medium textured, and the substratum is stratified, calcareous and coarse textured. It occurs as terraces in the lower portion of the watershed. The water table remains below a depth of 3 1/2 feet. Permeability is moderate in the surface and subsoil, and very rapid in the substratum. Gravel fragments may be bothersome for some uses. (Capability Class I).

Palmyra gravelly loam, undulating - This is a deep, undulating, well drained soil that has formed in sand and gravel deposits derived from glacial outwash. This terrace soil has a medium textured surface and subsoil, and a stratified coarse textured substratum. Slopes are short and range from 3 to 8 percent. Erosion is only a slight problem where the soil is left exposed. The water table remains below 3 1/2 feet throughout the year. Permeability is moderate in the upper part and very rapid in the substratum. Gravel fragments are bothersome for some uses. (Capability Subclass IIe)

Palmyra gravelly loam, rolling - This deep, rolling, medium textured, well drained soil has formed in glacial outwash deposits of sand and gravel. The substratum, starting at a depth of about 25 inches, is commonly stratified and calcareous. This unit occurs in the lower portion of the watershed on short slopes ranging from 8 to 15 percent. Erosion is a slight hazard. The water table remains below 4 feet, and permeability is moderate in the upper part and very rapid in the substratum. (Capability Subclass IIIe)

Wampsville gravelly silt loam, 0 to 3 percent slopes - This deep, nearly level, well drained, medium textured soil has formed in gravelly glacial outwash deposits containing a high component of reddish and greenish shale fragments. This terrace soil is stratified and calcareous below a depth of 40 inches. The water table stays below a depth of 3 1/2 feet, and permeability is moderate above the substratum. The high content of soft clay shale fragments reduces the quality of this soil as a source of sand and gravel. (Capability Class I)

Wampsville gravelly silt loam, undulating - This deep, undulating, well drained, medium textured soil has formed in glacial outwash containing many reddish and greenish shale fragments. The rapidly permeable substratum, below 40 inches, is calcareous stratified sand and gravel. Slope ranges from 3 to 8 percent, and erosion is a slight problem in areas that are near the upper end of the range. Water table depth generally comes no closer than 4 feet below the surface. Soft shale fragments reduce the quality of this soil as a sand and gravel source. (Capability Subclass IIe)

Wampsville gravelly silt loam, rolling - This deep, rolling, well drained soil has formed in gravelly outwash deposits containing many reddish and greenish shale fragments. The surface and subsoil are medium textured. Below 40 inch depths, the rapidly permeable substratum is calcareous, stratified sand and gravel. Slopes are short and range from 8 to 15 percent. Runoff is moderate and associated erosion is a slight hazard. The water table stays below a depth of 4 feet. Gravel fragments may be bothersome for some uses. (Capability Subclass IIIe)

Phelps gravelly silt loam, 0 to 3 percent slopes - This deep, nearly level, moderately well drained soil has medium textured surface and subsoil horizons. The substratum is coarser textured stratified sand and gravel that is calcareous. A seasonal high water table comes to within 20 inches of the surface early in the spring. Permeability is moderate in the surface and subsoil and moderately rapid in the substratum. Gravel fragments may be bothersome for some uses. (Capability Subclass IIw)

Phelps gravelly silt loam, 3 to 8 percent slopes - This deep, gently sloping, moderately well drained soil has medium textured surface and subsoil horizons over a coarser textured stratified sand and gravel, rapidly permeable, substratum. A temporary seasonal high water table comes within 24 inches of the surface. The horizons above the substratum are moderately permeable. Erosion is a slight hazard in areas that approach the upper limit of the slope range. (Capability Subclass IIw)

Odessa silt loam - This deep, nearly level, somewhat poorly drained soil has formed in deposits of reddish lacustrine clay and silt. The subsoil is moderately fine and fine textured, and the calcareous substratum is commonly varved with variable proportions of clay and silt. A seasonally high water table comes to within 12 inches of the soil surface. Permeability is slow to very slow. Variable stability is a consideration for engineering purposes. (Capability Subclass IIIw)

Honeoye silt loam, 3 to 8 percent slopes - This deep, gently sloping, well drained, medium textured soil has formed in firm calcareous glacial till. The till is derived mostly from limestone and alkaline shale. Erosion is a slight hazard. A seasonally high perched water table commonly comes to within 30 inches of the surface for short periods in the spring. Permeability above the substratum is moderate and in the substratum it is slow or very slow. (Capability Subclass IIe)

Honeoye silt loam, 8 to 15 percent slopes - This deep, sloping, well drained soil has formed in firm, calcareous glacial till. It is medium textured with moderate amounts of limestone and alkaline shale fragments. Erosion is a hazard, especially in areas under cultivation or construction. A seasonal high water table is commonly perched above, and moves across the top of, the slowly or very slowly permeable substratum for brief periods in the spring. (Capability Subclass IIIe)

Honeoye silt loam, 15 to 25 percent slopes - This deep, moderately steep sloping, well drained soil has formed in firm, calcareous glacial till. It is medium textured with a moderate amount of coarse fragments. Runoff is rapid and erosion is a severe hazard, unless protective cover is maintained continually. Permeability is moderate in the surface and subsoil horizons, and slow or very slow in the substratum. (Capability Subclass IVe)

Ontario loam, 3 to 8 percent slopes - This deep, gently sloping, well drained, medium textured soil has formed in calcareous, reddish glacial till. The till is mainly derived from limestone, reddish sandstone and alkaline shale. Erosion is only a minor hazard. The water table remains below 3 feet throughout the year, and permeability is moderate. (Capability Subclass IIe)

Cazenovia silt loam, 3 to 8 percent slopes - This deep, gently sloping, moderately well drained soil has formed in firm, calcareous, reddish glacial till. The subsoil is moderately fine textured. This soil is moderately susceptible to erosion. Good soil structure is more difficult to maintain than in the similar but slightly lighter textured Honeoye and Ontario soils. A seasonally high water table is perched above the slowly permeable substratum at a depth of about 22 inches for brief periods in the spring. (Capability Subclass IIw)

Cazenovia silt loam, 8 to 15 percent slopes - This is a deep, sloping, moderately well to well drained soil that has developed in firm, calcareous, reddish glacial till. The subsoil is moderately fine textured. Runoff is moderately rapid and the threat of erosion is serious. Good soil structure is moderately difficult to maintain. A seasonally high water table is perched within 24 inches of surface above the substratum for brief periods in the spring. Permeability is slow. (Capability Subclass IIIe)

Cazenovia silt loam, 15 to 25 percent slopes - This deep, moderately steep sloping, well drained soil has formed in firm, calcareous, reddish glacial till. The subsoil is moderately fine textured and has been mixed with the surface layer in some areas. Runoff is rapid, and erosion is a severe hazard. Some areas are dissected by closely spaced drainageways. Permeability is slow throughout the profile. (Capability Subclass IVe)

Wassaic silt loam, 8 to 15 percent slopes - This is a moderately deep, sloping, well drained, medium textured soil that has developed in calcareous glacial till. The till is 20 to 40 inches deep over hard limestone bedrock. This soil occupies a step-like landscape at the highest elevations in the watershed. Erosion is a hazard if the soil is left unprotected. Permeability is moderate or moderately slow above the bedrock. (Capability Subclass IIIe)

Camillus silt loam, 8 to 15 percent slopes - This moderately deep, sloping, well drained, medium textured soil has formed in semi-residual material weathered from silty shale, and influenced by glacial till. The bedrock, at a depth of 20 to 40 inches, is a soft, mildly alkaline shale that becomes harder with increased depth. Erosion is a very serious hazard on this silty soil. The shale bedrock is rippable. Permeability is moderate above the bedrock. (Capability Subclass IIIe)

Lairdsville silt loam, 3 to 8 percent slopes - This moderately deep, gently sloping, moderately well drained soil has formed in glacial till influenced residuum of soft, red clay shale of the Vernon formation. Below the moderately fine or fine textured subsoil is soft reddish or greenish shale bedrock at a depth of 20 to 40 inches. Soil tilth is difficult to maintain, erosion is a moderate hazard, permeability is very slow, and a temporary seasonal high water table rises up to within 24 inches of the surface. This unit is in the upland portion of the watershed. (Capability Subclass IIw)

Lairdsville silty clay loam, 8 to 15 percent slopes, eroded - This moderately deep, well drained soil has moderately fine and fine textures. Depth to the underlying soft, alkaline, reddish or greenish shale bedrock is 20 to 40 inches. This upland unit is the largest in the watershed. Erosion is a severe hazard with many areas containing shallow dissecting drainageways. A temporary seasonal high water table is within 30 inches of the surface, and permeability is very slow. (Capability Subclass IVe)

Lairdsville silty clay, 15 to 25 percent slopes, eroded - This moderately deep, moderately well to well drained soil has formed primarily in material weathered from red Vernon shales, with an admixture of glacial till. Subsoil textures of this upland soil are moderately fine or fine. Erosion is a very severe hazard. Rills and gullies are common in most areas. Good soil tilth is difficult to maintain because of heavy textures and loss of organic matter through erosion. Permeability is very slow. (Capability Subclass VIe)

Lairdsville silty clay loam, 25 to 40 percent slopes, eroded - This moderately deep, steep, well drained soil has moderately fine and fine textures. It has formed in residuum from red Vernon shale with an admixture of glacial till. Soft shale bedrock is within 20 to 40 inches of the surface. Runoff is very rapid, and erosion is a very severe hazard. Moderately deep, closely spaced, rills and gullies are common to most areas. Slopes prevent safe equipment operation and droughtiness is a problem. Permeability is very slow. (Capability Subclass VIIe)

Lockport silt loam, 0 to 3 percent slopes - This moderately deep, nearly level, somewhat poorly drained soil has formed in semi-residual material weathered from mildly alkaline, red clay shale with an admixture of glacial till. The subsoil is moderately fine or fine textured, and is very slowly permeable. Soft shale bedrock is at depths of 20 to 40 inches. A seasonal high water table, perched above the nearly impervious shale, comes to within 12 inches of the soil surface early in the spring. (Capability Subclass IIIw)

Howard fine sandy loam, 0 to 3 percent slopes - This is a deep, nearly level, well drained soil that has formed in glacial outwash deposits of sand and gravel. This moderately coarse textured soil occupies terraces near the downstream end of the watershed. Droughtiness is a slight problem during the drier summer months. The water table remains below a depth of 3 feet throughout the year. Permeability is moderately rapid in the surface and subsoil, and very rapid in the gravelly substratum. (Capability Subclass IIs)

Howard fine sandy loam, undulating - This is a deep, undulating, well drained soil that is derived from outwash sand and gravel. The surface and subsoil are moderately coarse textured, and the substratum is coarse textured. Slopes are short, complex and range from 3 to 8 percent. Erosion and droughtiness are slight problems. The water table remains below 3 1/2 feet throughout the year. Permeability is moderately rapid above the substratum and very rapid within the substratum. (Capability Subclass IIs)

Palmyra - Arkport complex, rolling - This is a deep, rolling, well drained complex of gravelly Palmyra soil and sandy Arkport soil. These soils, of glaciofluvial origin, form an intricate pattern on the landscape. The surface and subsoil are medium textured and moderately permeable in the Palmyra soil, and moderately coarse textured and moderately rapidly permeable in the Arkport soil. Slopes are generally short, complex and range from 8 to 15 percent. The water table is below 3 1/2 feet throughout the year. This unit has a moderate erosion hazard and gravel fragments may be bothersome for some uses. (Capability Subclass IIIe)

Palmyra - Arkport complex, steep - This deep, steep, well drained soil complex of Palmyra and Arkport soils has formed in glacial outwash deposits of gravel and sand. These soils form an intricate and complex pattern on the landscape. The Palmyra soil has a medium textured, moderately permeable surface and subsoil, while the Arkport soil is moderately coarse textured and moderately rapidly permeable. Erosion is a severe hazard, slope limits equipment operation, and gravel fragments are bothersome for some uses. The water table is below 3 1/2 feet throughout the year. (Capability Subclass IVe)

Cut and Fill land - This consists of areas that have had the original soil stripped and removed, and/or covered with other soil material. These areas are mainly a mixture of soil materials that show little or no soil profile development. Construction projects, such as the school and adjacent playfields north of Route 5, produce this kind of land. Soil properties are variable.